The Paper Industry Paradox

THE paper industry is keeping pace with other industries in the matter of volume tonnage increase this year as compared with the same months a year ago, but it is falling behind in its earnings.

A recent survey, including some thirty industries, shows that the average earning for the group was over 45 per cent greater in the first quarter of 1936 when compared with the same period in 1935. The paper industry, represented by ten of its leading units, shows a loss for the same period of 4.1 per cent under the 1935 quarter earnings.

Now, the paper industry is similar to the steel industry in that it is both an essential and a tonnage industry. In both, the price unit is on the ton basis.

What is true, then, of one tonnage industry should be true of the other. So, when the tonnage increase in the steel industry shows a corresponding increase in net earnings, one would be justified in looking for increased net earnings in the paper industry also. But look as one may, he is bound to be disappointed by finding no net earnings in the paper industry, for, in spite of unprecedented increases in the volume of tonnage going to the mills, the paper industry shows a loss instead of a gain in earnings. Therefore, one is forced to ask one's self this question—"What's the matter with the paper industry that its earnings decline as its tonnage increases?"

Now, we submit that this is a fair question and one which deserves the serious consideration of all paper mill executives, for with them lies the paradox.

It is an absurd and contradictory situation, one opposed to all experience and practice in industry.

Absurd as it is, nevertheless it is true that the paper industry is operating this year under the greatest demand for tonnage in its history, and yet its various divisions and units are showing deficits or "red ink returns."

Actually, millions of tons of paper products are going into the markets this year showing substantial losses to the producers. We have before us the amazing statement of one group of mills showing almost half a million tons shipped last year, equivalent to a 103 per cent capacity operation, and yet the corporation showed a deficit for the year. Another group of eight mills with a combined net worth investment of $287,388,900 shows net earnings for the year, 1935, of $1,880,100, or a ratio of 0.65 per cent.

We have other statements of other mills showing first quarter operations on practically capacity orders with "red ink returns" as a result.

Obviously, there is but one cause for this paradoxical situation—prices are too low.

Up to date, there has been practically no upturn in selling prices on paper since December, 1933, yet during that time, wood, labor, raw materials, chemicals, machine clothing and country, state and federal taxes have advanced. These advances, the mills have absorbed, and while further drastic advances are staring the industry in the face, there is a general reluctance on the part of mill executives to advance selling prices even sufficient to cover costs.

Obviously again, the selling prices of all paper products must eventually advance. Why not now? For there is no gainsaying the insistent demand for paper.

This year, 1936, will see the mills sending over 11,500,000 tons into the markets. This is the heaviest tonnage ever made in American mills, exceeding the 1929 requirements by almost, if not more than, a half

million tons. No mill management need fear any loss of tonnage or custom of advancing its selling prices. Every other competing mill has a capacity order book also and is suffering likewise from a lack of profit returns on its operations.

Profit must return to the paper industry.

On To Grand Rapids

A MERE mention of the word, "Michigan," to any dyed-in-the-wool papermaker should insure excellent attendance at the 17th annual convention of the American Pulp and Paper Mill Superintendents Association that is scheduled to be held on June 24, 25 and 26 at Grand Rapids.

Often thought of as a state in which automobiles are made and where celery and onions are grown, Michigan, in addition, is a papermaking state of no little importance. It doesn't boast of the largest number of mills; in fact, recent statistics indicate that there are only 55 paper mills within the state, and that these mills are operated by a total of 39 firms. Yet this relatively small number of mills and still smaller number of firms are responsible for making the State the second largest paper producing state of the United States. Figures for 1934 placed its production of paper and paperboard at nearly 900,000 tons.

Comparatively little information is available on the early history of papermaking within the State, but as early as 1876, according to published records, it had nineteen paper mills scattered over twelve counties.

Washtenaw County, at that time by far the most important county of the twelve from the standpoint of capital invested and value of product, claimed five of the nineteen mills. Berrien, Lenawee, and Monroe Counties claimed two mills each; while the Counties of Allegan, Calhoun, Genesee, Kent, Oakland, Shiawasee and St. Joseph each had one mill.

The mill in Kalamazoo County, no doubt, was located within the environs of the present City of Kalamazoo, as it is understood that one of the mills there produced its first paper in 1867.

Some of the other mills likewise have continued to function and to progress right down through the years. The expansion of these mills and the building of new mills have developed for the industry of today a heritage that indeed is colorful. The sulphate industry of the United States, for example, is reported to have had its origin in Muskegon.

From these various mills have come papermakers who have spread the fame of Michigan, and particularly Michigan papermaking practices, far and wide. They can be found most any place where paper is made, there making a creditable showing.

The most recent convention of the American Pulp and Paper Mill Superintendents Association to be held in Michigan was held ten years ago in Detroit. The superintendents organization has gone places since then, and for this year it has arranged a program, including an exhibition of equipment and supplies by various equipment manufacturers, that should prove of great helpfulness to any superintendent or operating executive who gets from the convention what is there for him to get.

Remember the dates June 24, 25 and 26. The place —Grand Rapids, Michigan. Make arrangements to attend and profit with those who do.

School Is Out

THE next few weeks will see the completion of another school year by the many schools, colleges and universities of this country. This season brings graduation time for thousands upon thousands of American youths, and to many of them it is the end of their formal education and the beginning of practical contact with the business of making a living.

Some of these young people will be looking to the pulp and paper industry as an outlet for their abilities and ambitions. This choice may have resulted from actual experience, from a personal familiarity with the field in the case of those who come from families associated in some capacity with the industry, or from observation, reading, or other such influences.

Of those making contact with the various pulp and paper mills of this country for employment, there will be some to whom a connection will be only a job and never anything more. If employed, they will never know what it is all about as their real interests are elsewhere. Others will give gladly of all of their talents and will fit themselves for such positions of responsibility as they are able to fill. Still a smaller group will have the makings of leaders of industry and it will only take opportunity and cultivation to develop them.

Courteous treatment and careful consideration should be given to each of these applicants that might contact your organization. If among them there is one or more of the first group, a friendly word of advice might not be amiss and it might aid in giving the individual or individuals the key that would point the way to a brighter future. The same sort of advice might be given with equal benefit to those of the other two groups who for various reasons could not be added to your working force, but every effort should be made to find a place for one or more of them in order to prove the quality of the timber. If found satisfactory, the result is beneficial for everyone concerned.

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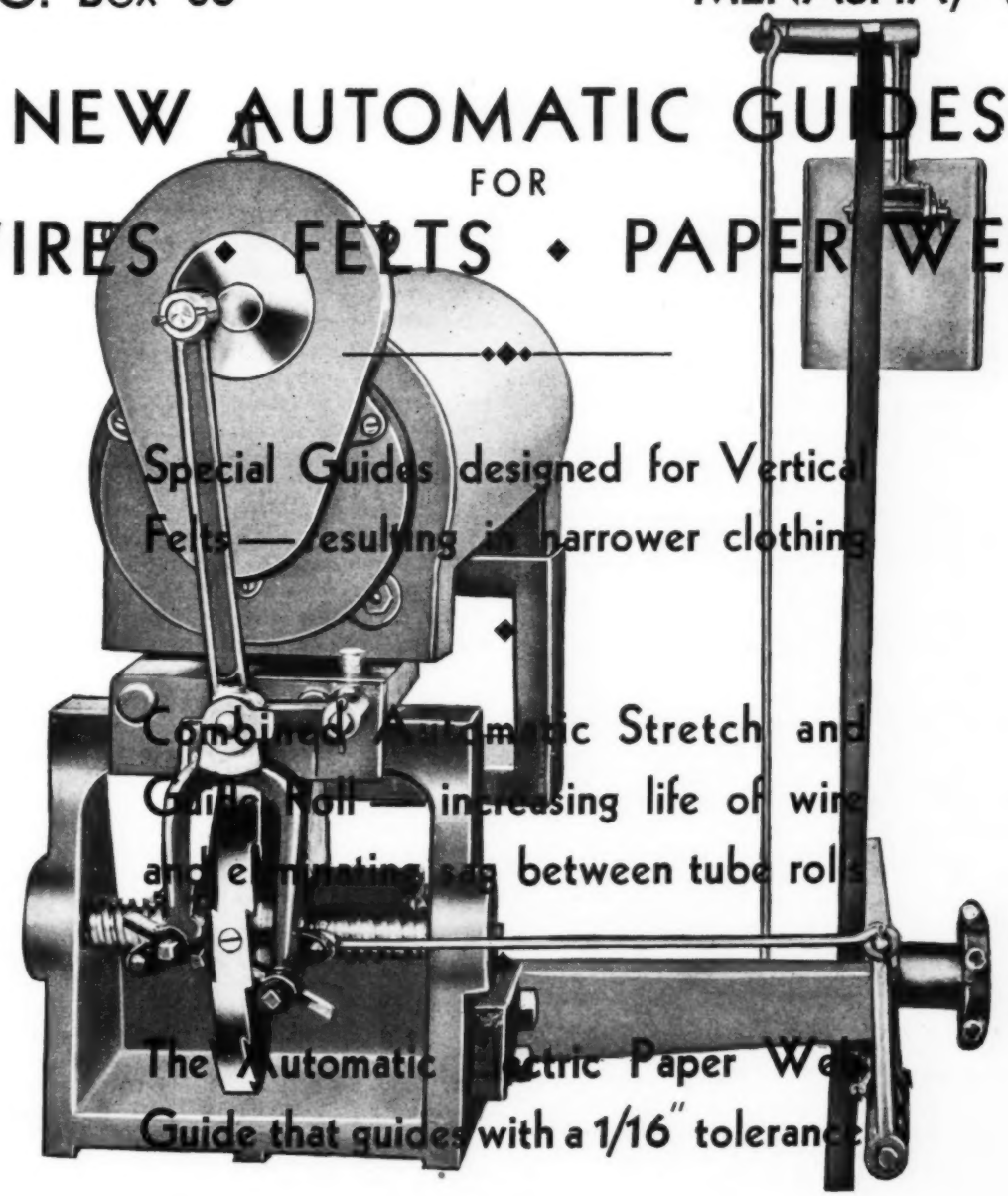

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A Flying Visit to New York City

WILLIAM SIBLEY

◆ ALTHOUGH A RESIDENT of Chicago, I spent the recent Memorial Day week-end in New York City. And since it was a business trip in which every minute counted, I traveled by plane. As a matter of simple facts (convenience, comfort, time, or expense), air-transportation is the way to travel in any event.

There is one thing that must be corrected, however. That matter of "excess baggage." Going to New York I carried a little personal bag and two heavy portfolios. My baggage weight came to 43 pounds—eight pounds over the allowable amount. So I was charged $1.98 for the "excess baggage." I, personally, tip the scales at 144; while right behind me, in the line at the ticket window, was a man who weighed at least 190—and *he* had 32 pounds of baggage. . . . But his ticket went scot-free of excess weight. Totally, he and his baggage weighed 223 pounds, whereas I and my baggage weighed 187 pounds. Yet I had to pay $1.98 for excess baggage. The reasoning behind this discrepancy of charges reminded me a little of the paper manufacturer who has to buy 15 per cent more coal for his boilers; yet produces 10 per cent less steam—merely because his boiler plant equipment is obsolete and inefficient. Both cases are short-sighted pocket-book policy; devastating to mental equilibrium.

◆ ON THE WAY to Cleveland, the plane skirted the edge of Lake Erie—along about Sandusky. Looking down, one could see in perfect outline the shore line, the geographic contour of Put-In-Bay; and in one's mind's eye could imagine Commodore Perry and his fleet of little windjammers meeting the English in the War of 1812, and subsequently remarking: "We have met the enemy and they are ours." Looking down and reconstructing that historic incident, I couldn't help but wonder what the resolute, old naval commander would have thought had he looked up and seen a similar two-motor Douglas go sailing over him. He probably would have suffered a hemorrhage!

◆ ARRIVING IN NEW YORK I picked up the *New York Times* and read of Governor Lehman signing the State pension bill, the principal provision of which was to reduce the pension age from 70 to 65. In signing that pension bill, the Governor remarked: "The bill now before me covers one part only of the eight-part social security program recommended by me. . . . It certainly is no less important for the State to help mothers with dependent children, blind people, crippled children, the physically handicapped and the sick than it is to assist the aged." . . . Which remark recalled my statement in these pages some months ago when I wrote about Dr. Townsend's plan for doling out $200 a month to everyone over 60. I said that while Dr. Townsend's suggestion would probably never become a law, the agitation for it and the political pressure behind it would doubtless force upon us costly compromises. Perhaps here in New York State we find evidence of the truth of my prediction.

◆ THE SHOP WINDOWS of New York City were filled with displays of the now famous "Queen Mary." New Yorkers love a show, and retailers are quick to take advantage of current events. One display interested me very much. It was in a corner window of the Empire State Building. The window showed a model of the Queen Mary standing on end—immediately alongside a model of the Empire State Building. And side by side were some interesting comparisons. For instance: the Queen Mary, when standing on her nose, measures 1,018 feet high—the Empire State Building being 1,250 feet high. The ship's gross tonnage is 80,773, while the weight of the building is 303,000 tons. But the weight of the steel in the ship's hull and machinery is 50,000 tons—while the weight of the steel in the Empire State Building is 60,000 tons. In the building there were used approximately ten million bricks; whereas in the ship there were used approximately ten million rivets. The ship has 21 elevators and 2,000 port holes, while the building has 74 elevators and 6,400 windows. The Queen Mary is equipped with 30,000 electric lamps; the Empire State Building has 35,000 lamps. In some instances, as you see, there is an interestingly direct parallel.

Of further interest is the fact that the giant ship carries enough passengers and crew to fill sixty-seven Pullman sleepers and fifteen coaches. Her engines have the power of fifty locomotives; and three locomotives could ride abreast through her funnels. In contrast to those figures, the Empire State Building holds 25,000 people and its power plant is big enough to light the city of Wichita.

◆ RIGHT UP THE STREET a few blocks (in Radio City Music Hall) there is shown a Walt Disney production: "The Three Little Wolves" (a sequel to "The Three Little Pigs")—which will turn the Disney people profits running into the millions. . . . And doubtless the Queen Mary will repeat the history of the Empire State Building and will turn her owners nothing but deficits. It is the little things that count. There is more money in laughter than in awe; more satisfaction in profits than in sheer size or number of sales.

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THE PAPER INDUSTRY
A MONTHLY EDUCATIONAL JOURNAL

Some Danger Spots to Papermakers

G. J. ADAMS, Industrial Supervisor
International Paper Company

THE recurrence of serious personal injuries to paper machine employees is due not to our lack of experience, or to our inability to determine causes, but rather to the method of operation which hinders and in some cases makes impossible the correction of known hazards.

The operation of a paper machine is actually the operation of a number of individual sections, each performing its purpose as a step in the final production of the sheet of paper which necessitates a constant speed of all these sections as a unit. Due to the nature of the product, which in its course over the machine is carried by or between rolls, there are created several hazardous inrunning nips which are difficult and in some cases impossible to guard without interfering with the manufacturing process.

No one of these various sections of the machine can be temporarily shut down or even slowed down without a considerable resulting loss to the plant in production. Minutes mean dollars—and the resulting hurry to remedy a temporary break is one of the most difficult problems in preventing injuries.

However, any program to minimize the hazards of papermaking must recognize these conditions as necessary—not give up because of them but succeed in spite of them.

Under these conditions, mechanical guards prove to be more effective in preventing personal injury than any other means. However, due to the impossibility of providing guards at some points, a great deal of thought should be given to careful selection, training and supervision of the operators, and whether or not it meets with approval, the enforcement of standard safe operating practices is the only means at present by which paper-makers may be prevented from crushing fingers, breaking arms and often losing their lives at some points of the operation.

One of the danger spots that frequently causes broken arms is at the wet felts and felt carrying rolls. The accidents that occur here are usually the result of trying to straighten felt wrinkles while running, pulling the edge of the felt to keep it from running to one side of the machine, reaching the hand in to scrape stock from one of the felt carrying rolls and when pulling and turning felts during washups. Everyone who has worked on a paper machine knows that it is much easier and more effective to straighten a felt if the pulling is done close to the point where the felt runs onto a carrying roll, in other words, just in front of the pinch. This, however, is bad practice and often results in serious injury. The following is typical of the many accidents that have occurred because of this practice.

A wrinkle developed near the edge on the backside of the second felt. The machine-tender reached up just in front of the top carrying roll, tugged at the edge of the felt, the wrinkle holding his fingers and drawing

his hand and arm up over and between the carrying roll and felt. Needless to say, his arm was badly broken and his best luck was that his neck was not also broken.

In one mill, this type of accident repeated itself a number of times. Finally a rule was adopted which forbade employees to pull felts for any reason at points other than on the other side of the roll away from the inrunning nip. Better still, the rule was enforced and broken arms from felt rolls went out of style.

The smoothing presses form a dangerous inrunning nip. Accidents at this point are not numerous but those that do occur have serious results. Smoothing presses should be equipped with a rope carrier to take the sheet through (Figure 1). They can be made 100 per cent safe by reversing their rotation and providing a carrier to take the sheet over the top roll and into the nip on the side next to the dryer and away from the operator. This does not interfere in any way with production (Figure 2).

During the night shift at a paper mill recently, the sheet was broken down at the couch while the machine-tender hosed down the slice. Taking advantage of the temporary shutdown, the boss machine-tender according to his previous arrangement with the crew, engaged himself in mending a tear in the top dryer felt seam. He spotted the seam on the first top dryer and in doing so had some difficulty which should have indicated to him that the clutch was not in proper adjustment. At any rate, he threw some wet broke up onto the first dryer in the space between the smoothing press and the top dryer and crawled up into a position in which he was standing on top of the first bottom dryer to sew the tear in the seam. Suddenly the dryer clutch engaged itself, starting up the dryer section, and he was drawn into and went around the first two bottom dryers before his fellow employees could shut off the power. He was instantly crushed to death.

This was an extremely regrettable accident because the remedy for the hazard is so simple. Regardless of the condition of the clutch, and regardless of ensuing arguments as to whether all sewing of dryer felts should be done at the other end of the section adjacent to the calender stack, the principal point is that an employee never should stake his life on the dependability of the machine. The practice that caused this fatality is, we have since found, a common practice in other mills. The remedy is simple—a foot-board placed at this point securely fastened in place does not interfere with the machine in any way and gives employees a safe working space if needed. It is not enough to provide a foot-board that can be removed and replaced when needed—it usually can't be found when needed. An illustration of such an installation with the foot-board fastened in place with hinges so that it can be turned up on edge out of the way if necessary is shown in Figure 3.

Old scars of crushed finger tips have served many papermakers as references of their ability and experience. These trade-marks, however, are becoming less numerous. This is not entirely due to any success in providing mechanical means of guarding the stack pinches, but rather probably due to more attention being given to proper operation when stacking paper together with impressing employees with the need of safety mindedness.

Various types of guards have frequently been suggested and some tried on calender stack pinches but except on very slow machines making heavy grades, there is considerable interference with operation by any device that will give adequate protection.

On slow running machines on heavy grades and board it is possible to protect the inrunning pinch where it occurs on the stack by installing a length of angle iron across the width of the rolls in such a position with the angle in toward the pinch that the paper can be fed into the rolls without allowing space enough for the operator's fingers to be caught. This installation is similar to that used on supercalender stacks described below.

Any type of guard used on stacks on lighter grades of paper and at higher speeds interferes considerably with the course of the paper through the rolls and causes damage to the rolls themselves. These rolls must be carefully ground and maintained if the proper finish is given to the sheet. A guard at the pinch will often cause paper to wind up or wad on one of the rolls, necessitating a costly shutdown and probable change of one or more rolls.

Various improvements that have been made to calender stacks for improved operating efficiency have also acted as safeguards and have reduced the hazards to some extent. Improved doctors, finger guides which guide the sheet from roll to roll, or air ducts which accomplish the same result have helped reduce stack accidents.

The requirements of the various state factory inspection services for guarding calender stacks are probably well illustrated by the two following:

Wisconsin General Orders

"Order No. 61—Calenders—Doctors. On all machine calenders used in paper mills, except super calenders, each roll must be equipped with an efficient doctor."

"Order No. 62—Calenders—Feeding Belt. On all machine calenders except super calenders, where the paper is taken over the top roll to be fed into the first nip, a feeding belt or other efficient device must be provided to conduct the paper into the first nip and thus make it unnecessary for the operator to use his hands in this dangerous place."

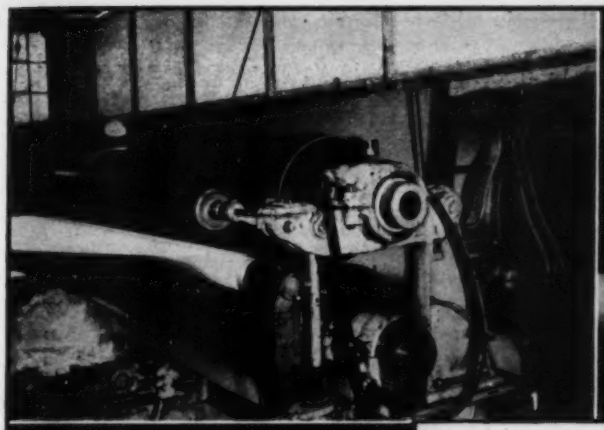
New York State—Industrial Code—Bulletin 19

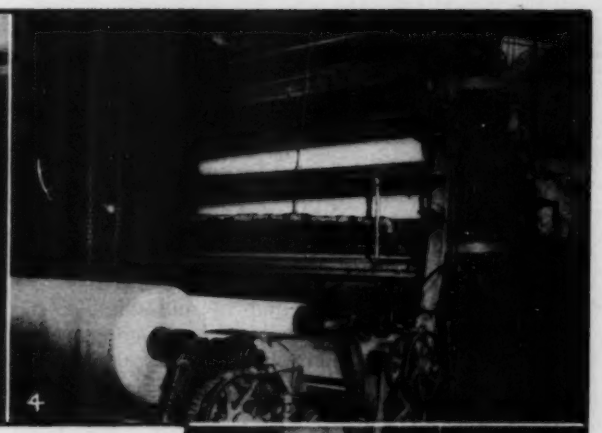
"Rule 916. Calender Rolls, Class B. The calender rolls shall be guarded or equipped with a feeding device at inrunning side so arranged that the material can be fed without permitting the fingers of the operator to be caught between the rolls."

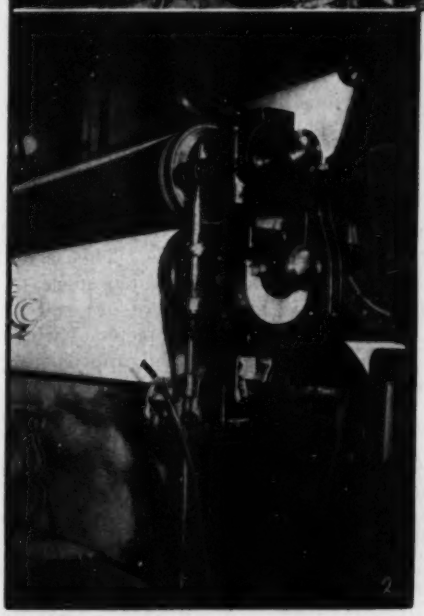
This New York State rule, however, is what is known as a *Class B* rule, which means that the rule applies unless the nature of the work will not permit.

The problem of mechanically guarding calender stack inrunning nips at the present time is, therefore, more than an ordinary one. The only definite recommendation that can be made is that if the speed of the machine is slow enough, which is usually the case on heavier grades such as board, roofing, etc., then a positive angle iron guard at each nip both front and back sides is possible.

The majority of injuries received at this point consist of crushed fingers when putting the sheet into the







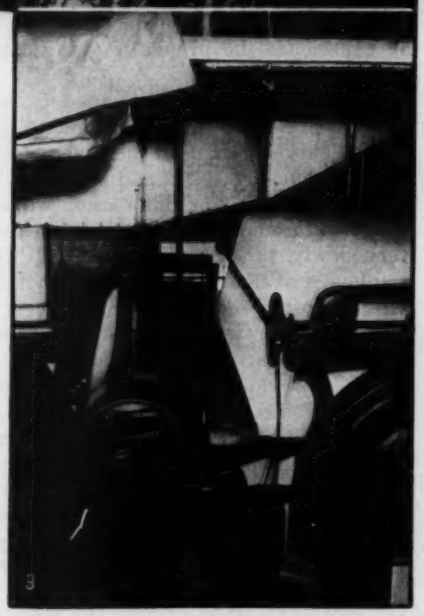


Fig. 1—Smoothing press rolls. Showing sheet fed direct into nip. The carrying roll and rope carrier tend to reduce the hazard

Fig. 2—Smoothing press rotation reversed. Note carrier taking sheet over top roll and into nip on side away from operator. No hazard

Fig. 3—Footboard at dryer section provides working platform for sewing or mending dryer felts

Fig. 4—Paper machine calender stack. Note modern doctors, working platform with hand rail, air ducts to guide paper down stack and steps covered with non-slip surface

stack from the dryers and when operators grab at the sheet to help it in its course down through the rolls to prevent wadding. The rolls rest one on top of the other in bearings that are movable vertically, and often a wad of paper causes the rolls to jump, catching the fingers or hand of the operator who had grabbed at the wad at the same moment.

The hazard of feeding the paper from the dryers to the stack by hand can be overcome by equipping the machine with an automatic air feed which blows a tail of the sheet along a galvanized iron chute into the nip. This equipment like other automatic feeds and carriers is a necessity on the newer type high speed machines, particularly in newsprint mills.

A very sensible suggestion is offered by an old-time papermaker. He endeavors to train the employees, when stacking a tail of the sheet from the dryers, to grab the tail with the hand balled into a fist so that if the hand does get too close to the pinch in the stack there is not the danger of injury as if the fingers were extended.

Another cause of injury is when the back-tender attempts to use his metal hand scraper to remove a spot from one of the rolls, the roll drawing the scraper and his fingers into the pinch at the slightest inattention or slipping of the scraper. This scraper is usually a flat piece of steel which the back-tender carries in his hip pocket. Attempts have been made to enforce the use of a scraper equipped with finger guards. This, however, is clumsy to handle and the principal objection is that it can't be carried in the pocket and therefore is not available when needed. One back-tender has offered the suggestion that a guarded scraper is not necessary if the operator will hold his ordinary flat scraper against the roll in the proper position. This is very true, but again there is the human element to contend with, and experience has proven so far that it is not entirely dependable.

Loose clothing, neckties, pieces of rag in the hand and the ends of air hose not equipped with nozzles often catch in the calender rolls and cause injuries. Frequently the toes also are caught in the pinch. Recently a repairman climbed to the top of a stack to make an adjustment. The sheet had been broken down at the wet end, but he did not take the time to shut down the stack which could have been done with a turn of his wrist. His shoes were rubber, and in his climb he stepped on the doctor. The rubber shoe against the

pinch was readily drawn in, crushing his toes up to the instep and necessitating amputation of his foot above the ankle.

While at the present time, adequate protection cannot be provided at the inrunning nips on calender stacks, there are a number of precautions that should be taken which will minimize the hazards. Provide automatic carriers where practical. Maintain the steps on the side of the frame, and if necessary cover with a non-slip surface. Provide a working platform across the face of the stack equipped with a handrail so the back-tender won't have to climb up and stand on the doctors. Keep the floor surface free from oil and clutter so that operators will not slip and throw their hands into the rolls. Most important of all, properly instruct the operators, particularly the younger men who occasionally help around the stacks, so that they may learn by experience the proper way to do this work (Figure 4).

The calender stack on a paper machine must necessarily operate at a speed constant to that of the other units. This is not true of the supercalender stack which is a machine by itself and thus can be operated at variable speeds. For this reason, while paper is being threaded through the rolls, the supercalender can be run very slowly, thus providing complete protection to the employees so that their fingers cannot be caught in the nips. Figure 5 shows a supercalender with slotted angle iron guards protecting the inrunning nips. The stack in the illustration is completely guarded, that is, a guard is provided at each of the nips on both the front and back sides.

Some difficulty was at first encountered when solid angle iron guards were installed. When sanding the rolls on this particular stack, it is necessary for the operators to see the nip, which was impossible with the solid guard. Therefore, it frequently occurred that the guards were removed during sanding and not replaced. To overcome this, a series of slots was cut in the guards lengthwise along the angle of the iron permitting vision of the nip without removal, because the sanding operation in itself is hazardous without protection.

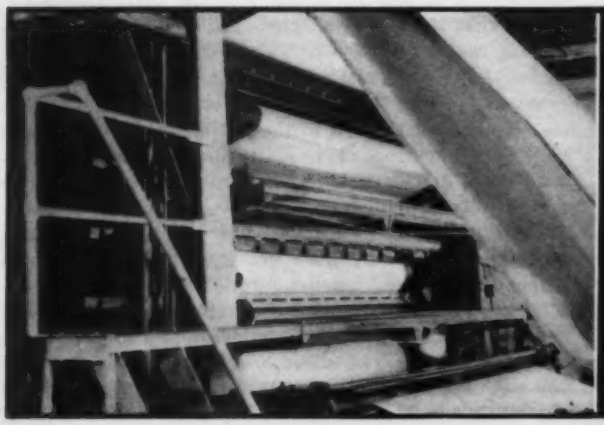
On a 154-inch super stack the detail of the guard is a 3 inches x 3 inches x ¼ inch slotted angle iron fastened on adjustable brackets to the frame of the stack and adjusted so that the angle is in toward the nip with a ⅜ inch clearance between each side of the guard and the corresponding rolls. The slots are ⅝ inch wide cut lengthwise along the angle, each slot 8 inches long with 3-inch solid intervals.

This particular stack is equipped with four fly rolls, three on the front side and one on the back. For some time the plant management was influenced by both the operators and the foreman that guards at the nips adjacent to these fly rolls would seriously interfere with the operation. Meanwhile an operator caught and painfully injured his fingers at one of these unguarded nips while threading the sheet through. As a result of this accident, guards at these points were installed exactly the same as the others except that the angle of the guard was adjusted so as not to interfere with the draw of the paper over the fly roll.

A good many paper machines still use stacked-type reels which form a serious hazard. If the winder gets behind, the two reels of paper become large enough and approach each other to a space which forms a dangerous inrunning nip. A number of fatal accidents have occurred here when the back-tender was caught and drawn between the two reels. A positive correction, of course, is to do away with stacked reels. This is not always possible, however, because of limited space.

In order to correct this hazard there are several devices. One consists of a wheel the diameter of which is large enough to prevent the two reels approaching each other to a distance which would create a hazard. This wheel is installed in the space between the two reels.

Another device that will prevent serious accidents from this cause is shown in Figure 6. This consists of a bar of ordinary pipe rail stretched across the width of and between the reels to provide a stationary surface, so that in case an employee did get caught, he would not be drawn into and crushed between the rolls. This bar is easily adjustable vertically, being installed with each end in a slot and counter-weighted so that its position can be changed by grasping the bar itself and moving either up or down as required. This bar device appeals to production men because the small amount of space it occupies does not compel interrup-



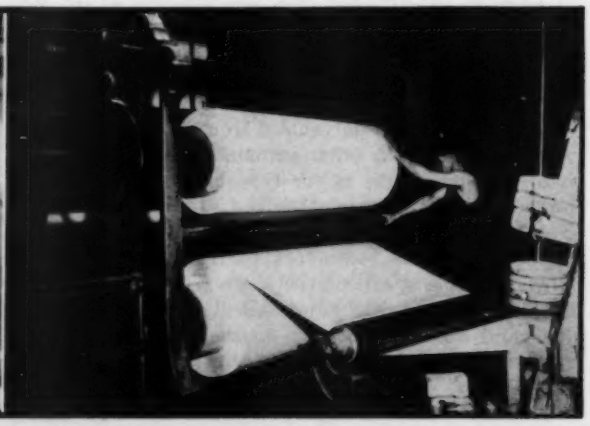


Fig. 5—(left) Supercalender stack. Each inrunning nip, both front and back sides, guarded with slotted angle iron guards.
Fig. 6—(right) Stacked reels with iron pipe guard installed between reels

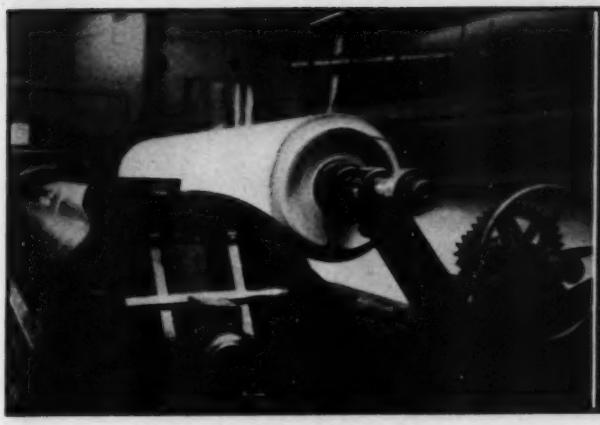


Fig. 7—English type reel

Fig. 8—Paper machine winder guard

tion in production as often as does the wheel device.

The English type reel also has caused a number of serious injuries. Here is another point where the use of compressed air to guide the paper onto the reel helps reduce the hazard. Operators often get fingers and hands crushed when reaching to grab a piece of broke sticking to the drum. Note the illustration in Figure 7. The sign on the end of the reel calls attention to the fact that hands must be kept off and air used to blow off the broke. Also notice on this particular reel that the rotating ends of the drum are protected by iron shields. Many reels are protected in this way by the machine frame. The hand rail on the backside of the reel is to protect the operator who must climb up to a platform to hook on the air hoist when changing reels.

While there are a number of different types of paper machine winders, the hazard formed by the inrunning motion of the drum and the roll of paper is the same on each of them. A number of various types of guards have been tried out but as yet none has been developed that gives complete protection. Most winders are now equipped with a guard which forms a barrier such as shown in Figure 8. This barrier guard may be a swing type fixed in position, or may be installed on counterweights so that it may be either raised or lowered when removing the finished rolls. Some variation of this guard can be adapted to any type of winder.

This guard, however, offers very little protection when the roll of paper is small on the core or while the operator is feeling the roll for corrugations, wrinkles, etc. There has been a great deal of difference of opinion as to whether it is necessary or not for operators to feel the roll while winding. At any rate, most of the winder accidents occur when this is being done. Several mills have adopted a definite rule that employees shall not place their hands on the winding roll until the roll has wound to a diameter of about 7 inches, at which time it is considered that this can be done with less danger of being caught.

In the earlier days of interest in accident prevention a number of attempts were made to guard various points of operation on paper machines with devices that proved impractical and which resulted in loss of machine time and production. Consequently, operators became imbued with the idea that any safety device on the machine was more of a hindrance than a help. This thought continues even today and the engineer who has a guarding problem will do well to approach it by first contacting the operators and soliciting their help and suggestions before installation. Otherwise, it is quite probable that such devices as are installed may be found thrown out the window at the first opportunity.

It is evident, however, that accidents in this department have decreased and that considerable progress has been made to mechanically guard many of the dangerous points on a machine.

Just as important as mechanical guards in this department, is the selection and training of personnel. If possible, it is desirable to fill any vacancies that might occur in the higher skilled occupations by promotion. In order to accomplish this, and bearing in mind that a good back-tender or machine-tender is competent because of several years of experience on the job, it is then necessary to carefully choose the new employees who begin as 6th hands or broke hustlers. First, this new man should be a young man. Consider him as a future machine-tender and choose him with the necessary qualifications in mind. Then, when he is put on the job, not only should he be encouraged to learn the steps necessary for his advancement, but the foreman and those higher up in the crew should take particular care to show him how to do these steps properly. This is not molly-coddling, but rather is building up a good machine organization that will be both efficient and safe. If after a sufficient period of time has elapsed and it is found that this young man is not suited to paper machine work, he should be removed at once. There are too many men at present employed in paper machine crews as 4th hands and 3rd hands, who are middle-aged and who never will be qualified for promotion. It would be a favor both to the employee, who could adjust himself in some other type of work for which he is better fitted, and also to the plant to maintain its efficiency, if such employee were not allowed to continue in this department after it is evident he was not fitted to do so. Our accident records substantiate this thought because we find that more often than not, injuries are sustained by employees on the paper machines who have not the keenness of mind and the natural technique necessary to be a part of the paper machine crew and to receive the ordinary advancement that their age and length of service should require.

Although muskeg bog or marsh areas may not grow much pulpwood, they do constitute valuable lands in terms of shelter and feed for wild life, fire lines, etc.

Wild Life and Recreation

W. E. SANDERSON, Director Wild Life Department
American Humane Association

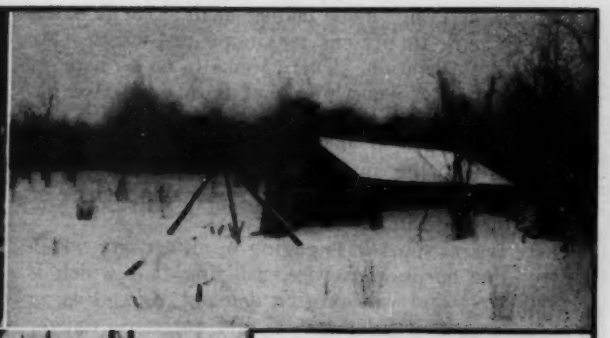
THE paper industry is dependent on the forest for a large portion of its raw materials since the same raw materials come from the flora. From its ecological standpoint the fauna is also an important part of the forest. Wild life is a part of the fauna and is dependent, directly or indirectly, on the flora for food and shelter. As the paper industry takes its raw material from the forest, the conditions for wild life are changed.

As long as the paper industry uses forest products for raw material, there will be an interest in maximum production at minimum expense. Foresters have been engaged in trying to help solve some of the problems of forest land owners who supply raw material for the paper industry, but it is surprising how little attention foresters in general have paid to what recently has been referred to as "The Theory of Multiple Use" and "Correlation of Land Uses." It has seemed to be a case of such high specialization that they have spent all their time on only a part of the flora and practically none on the fauna. Timber crop foresters talk about sustained yield, even aged stands, cutting cycles, etc., but the business man wants all these expressed in yield per acre per year, or net income on his investment. Labor is looking for a place to spend more time doing something for which it will receive remuneration to supply at least the necessities of life. With all that is being said about game management, wild life management, etc., it is not surprising that foresters and others engaged in harvesting forest products are showing more interest in the possibilities of wild life and recreation as a possible source of revenue.

Regardless of where an individual is or what he is doing, sooner or later an interest in wild life or recreation will be felt. Surely the paper industry is concerned about its raw materials. Some may take the attitude that regardless of the supply, the finished products will enter into competition on an equal basis. The results will be a problem of the consumer bearing the expense.

There may be some hope in the idea of letting the land ownership, carrying charges and all, go under government control. However, there are still many individuals or organizations who have extensive holdings of land from which raw materials for the paper industry will come. Likewise, there is an inherent desire with many to own some land. Often coupled with this is the inability to hold it as a paying business proposition. To these, there may be something along the line of wild life management to be worked out from this "Theory of Multiple Use." Note the term "wild life management" is used instead of the term "con-

The author of this article suggests that landowners may be overlooking a source of income from their timberlands. Providing food and habitat for wild life and planning recreational retreats have been found to yield a nice profit with very little expense



The three log cabins shown above and to the left illustrate how a little planning in locating and constructing logging camps may provide valuable buildings that may be used for hunting or fishing camps or recreation shelters

In the scenes below and to the right, notice the fringe of timber around the lakes and along the stream. This furnishes a habitat for wild life and enhances the recreational value of the land. Properly planned trails make it easier to fight fires

servation" or even "game management," for it is the author's desire to present maximum possibilities for land use or utilization. There seems to be no hope in overproduction of something that is in danger of being disposed of for less than cost of production, including all the proper charges, but there does seem to be hope in utilizing any product of the land that now enjoys a demand or that has a reasonable chance of being in demand in the future.

There is real sport in engaging in an activity which does no one harm. Likewise, utilizing that which is available to supply an existing demand, as well as an apparently growing demand, should not cause danger of overproduction and the customary hazard of competition, fair or otherwise.

For example, who knows where there is enough game to meet the demands of all sportsmen? Many are equipped with rod, gun and all the wearing apparel, etc., who are good examples of the saying "all dressed up but no place to go." The paper industry may be satisfied with the present share which its products get in supplying the part paper takes in all this dressing-up business. But there is an added demand which seemingly it has overlooked—that of providing more places to go, which will automatically demand more dressing-up equipment.

Over twenty years ago when the author first started to study wild life and recreation under trained teachers, it was pointed out to him that the land owner should be considered. Naturally, it was amusing only a few years ago to hear a prominent sportsman bring out that same point as being new and original. It is significant that there may be an awakening on the part of many that there is something to be gained by consulting the findings of scientists and other specialists who know the fundamental truths. These truths may be useful to some in the paper industry who as the wheels of production slow down or stop for lack of demand, realize that there is a source of income in their possession which thus far has not been utilized.

For years, criticism has been voiced against the big, bad lumberman who cuts the usable timber and leaves the remaining timber and undergrowth to be ruined by fire. It appears that this criticism was merely fault-finding, for it has been a general rule that where there was utilization of natural resources, there was also more or less wanton waste. A review of such past practice should point to a better way in the future, so why not take an inventory of stocks and strive to better conditions?

If the inventory is complete, items of fauna will appear as well as items of flora. Paper is made from trees which are only a part of the flora, and this is as far as many go. Twenty years ago this attitude could "get by." Likewise, there appeared to be unlimited supplies of raw material, but there is now a realization that even great forests can be depleted and that changes must be made to meet changing conditions.

If land owners will accurately inventory their stock, it is believed they will see possibilities of offering to the highest bidder more than just so many cords of pulpwood per acre. For instance, it should be profitable to sell the privilege to hunt, fish, trap or to put the land to some other remunerative use while it is being held to grow other crops. Wild life requires no care and will adjust itself without much interference by man. But one must consider that careless hunters may set the place on fire; a trapper may not have conducted his operations so as to bring a maximum return; and even those who removed the pulpwood may have needed more supervision. Good management would leave the fire hazard at a minimum, trails marked and open, springs and streams unpolluted, thus providing food and shelter for wild life.

Some authorities advocate burning over a cut-over forest to bring about desired conditions for future use. However, it is the opinion of the author that this should never be done for the reason that enough fires will occur accidentally to produce any of the desired results of burning in case there really is any such demand.

Much profitable work may be carried on throughout the year on a forest, such as road and trail improvement, fire patrol, looking after wild life, improvement thinnings, etc. A sportsmen's club may be paying for

Old right-of-way areas and logging roads serve as valuable fire lines. Fires often occur on cut-over land and such species as aspen come in. When this happens and there are some ponds or streams, the greatest immediate return per acre per year may be from beaver. They build their own dams and houses

the hunting and fishing rights. A trapper may act as caretaker for the club for the trapping rights. Yes, an adequate management plan properly executed can give additional employment and bring the land owner something more on his investment.

The matter of wild life management may not concern many of the paper industry, and what little interest there is may be distributed in a variety of ways. It may take the form of an individual interest in wild life from the standpoint of recreation—hunting, fishing, etc. The matter of unpolluted water may have escaped the notice of the paper mill operators until they were prosecuted for dumping poisonous waste into streams and then learned that this waste destroyed fishing as well as caused other harmful effects of water pollution.

Much the same attitude is taken toward the idea of birds helping to control harmful insects, or of visualizing a possible income from fur bearing animals that inhabit most forests.

In case this article arouses a specific interest, the reader should be cautioned against being content with the possibilities offered by these so-called game man-

If fire is kept out, many desirable camp sites will be available to attract those seeking recreation and who will gladly pay for the privilege. Keeping trails open will make such areas more accessible

Capitalists may have overlooked some of the by-products of the land they hold an interest in mainly as a source of supplies of raw materials for the manufacture of paper. Pulpwood will float down a stream whether there are fish in it or not. A forest fire destroys pulpwood and prevents growth of other forest land, flora and fauna. The land owner, pulpwood operator or other timber product operators no longer can take the attitude that they are not concerned after they have cut a crop and floated it down to market.

Foresters have shown that this matter of forest management is something to be considered. Now some of the foresters, as well as others, are beginning to realize that there may be something to manage in the forest besides a crop of timber. Of course, they saw where the beaver had a built a dam, cut down some timber and flooded some more. All of these activities were looked upon as a hindrance instead of suggesting a way whereby more revenue could be produced per acre per year on some portions of the forest than from other sources. Instead of looking upon the beavers as builders of storage reservoirs to hold water for fire fighting purposes, breeding places for waterfowl, holding back water in flood times, making fish ponds and swamps where muskrat could breed, they meant nothing to the forester but trouble, so he joined those who were against the beaver.

agement activities, for game is only a part of the wild life possibilities. For example, fish is game and it has been claimed by some that such wild life as beaver, otter and raccoon are detrimental to good fishing. In the first place, any pronounced damage is questionable; on the other hand, these fur bearers may be just as valuable as fish, or even more so from the standpoint of income from an area.

Nevertheless, some of the sporting groups say there is much to be learned. When these so-called vermin hunters or predator controllers are permitted to go forth with their poison it may mean the killing off of some of the most valuable species of wild life.

Pathetic mistakes are being made. Consider grazing domestic cattle on wild range, then feeding wild, big game on domestic feed. While sportsmen in one state were feeding rabbits, a nearby state was offering good money for rabbits for liberation. People in nearby cities were seeking food, and a foreign country was shipping in large quantities of rabbit skins. A federal agency was planning to poison rabbits because they were said to be injuring some forest plantations. One year they were conducting rabbit drives to rid a section of jack rabbits and the very next year sportsmen were planning to liberate rabbits to insure better shooting.

There is a demand for good fur, yet trappers are receiving as low as $2.50 each for pelts and take a life to obtain them, when by a known method, these same animals would possess a pelt that would bring as much as $50 if allowed to live one to three years longer.

A serious study of this subject will reveal possibilities not thought of before. Adequate management plans properly executed *can* give additional employment and also bring the land owner something more on his investment.

Fuzz in Newsprint Production

O. M. MOHN, Chemist
Lake St. John Power & Paper Co., Ltd.

FUZZ trouble on printing paper is caused by fibers which project from the surface of the paper sheet. Some of the ends of these fibers break off during the drying and calendering operations, while others break when the sheet is printed. This action causes the sheet to become hairy and dusty—or fuzzy.

The chief cause of fuzz on newsprint is the groundwood stock used in its furnish. One contributing factor is excessively hot dryers in the first part of the dryer section. Other factors would include the passing of an exceptionally moist sheet over excessively hot dryers in the first stages of drying and overdrying at the dry end. A high percentage of hard, unbeaten sulphite also may cause fuzz. Likewise, the type of wire, the vacuum on the wire, and the conditions of pressing and smoothing the sheet have some influence. Nevertheless, since newsprint paper consists largely of groundwood pulp, it is the quality of this furnish that has the biggest influence on the finished paper sheet.

Rapid creation of fuzz is more likely to occur with a coarse groundwood than with fine fiber, because a coarse pulp fiber or fiber bundle (actually a little stick of wood with torn ends lying on the surface of the sheet) exposes a much larger contact surface to a hot dryer than does a single fine fiber. This coarse fiber or fiber bundle, being more weakly interlocked into the sheet by smaller fiber, has the tendency to adhere to the hot dryer. When the coarse fiber sticks to the hot dryer, it, of course, loosens in part or wholly from the sheet and tears other fiber ends clinging to it.

A paper sheet of coarse pulp, likewise, dries more readily than does a sheet of fine pulp due to its more open texture. Such a sheet, however, will not dry as uniformly during the first stages of drying. In fact, the coarse surface fibers with a low capillary action will dry first and thus make an effective insulation for the inner layers. The trapped moisture finally vaporizes and escapes through the interstices of overdried fibers during the later stages of drying. On the other hand, a sheet of fine fibers with high capillarity, dries more slowly on the surface. This allows the water from the inner layers to be vaporized more readily and permits the drying to take place more uniformly throughout the thickness of the sheet.

A wet sheet of paper always has a tendency to adhere, more or less, to a hot dryer, the severity of adherence depending on the wetness of the sheet and the temperature of the dryer. This tendency, when coupled with the sheet characteristics of a coarse groundwood, makes it easier to produce a sheet without fuzz from slow and fine stock. At the same time, in order to minimize the tendency of the wet sheet sticking to the hot dryer, the sheet should be pressed as dry as possible and well smoothed before entering dryers.

In passing over the dryers, the paper should be heated gradually. This procedure permits the paper to dry evenly and prevents the surface from drying faster than the center.

If the surface drys faster than the center, to any degree, the higher wetness of the center impairs the strength of the sheet. This impairment of strength causes some of the surface fibers, whether fine or coarse, to be torn loose from the sheet and some of the fiber ends, consequently, are torn out. Such action can be observed in paper drying on most machines.

Drying should not proceed at a rate faster than that which will allow the sheet to reach at least 50 per cent bone dry before it comes in contact with a dryer surface temperature of 220 deg. Fahr. This condition should not be reached on a modern news machine before the sixteenth to eighteenth dryer, or about one-third the way down the dryer section. Of course, the position will depend on the wetness of the entering sheet and on the speed and number of dryers on the machine.

A hairy paper sheet was a daily problem in a mill with two small news machines and one Yankee machine, with which the author was connected for several years. This mill was compelled to purchase a very free groundwood from only one source. It also had to run its narrow news machines as fast as possible in order to stay in the newsprint market.

The speed of operation was limited by the drying capacity of the machines, but they were run at about 750 f.p.m. with 24 to 28 lb. gauge pressure within all of the twenty-four dryers of each machine.

Such speed and temperature conditions of drying, together with the free groundwood, caused the dryers to be covered with a layer of burned pulp and made it necessary that the doctors on the first three bottom dryers be swept clean of paper dust at least twice a shift.

In attempting to correct this condition, the steam flow to the first five dryers (not including the baby dryer) was reduced so that the temperature gradient rose from 140 deg. Fahr. on the first dryer to 212 deg. Fahr. on the fifth. This regulation almost eliminated the dust on the doctors. At the same time, since the dryers remained cleaner, heat transfer was better and the paper finish was improved greatly. However, the groundwood was still too free and the rate of drying was too rapid to remove the fuzz difficulty entirely.

It should be pointed out that a satisfactory sheet of paper can be made from very free groundwood and hard sulphite through proper beating and refining of the stock in beaters, Jordans, or other suitable stock treating equipment. The refining process makes the groundwood furnish finer and slower, and the resultant paper is more brittle.

Therefore, having the pulp fine enough, the sheet should be dried carefully so that it will retain at least 6 per cent moisture before entering any moistening process and before calendering.

The finish on the sheet may be improved by artificially moistening the paper sheet up to 9 to 10 per cent, even if the paper has been overdried. This improvement in finish on an overdried sheet, however, is only temporary, as it will disappear, sooner or later.

Even though the pulp is moderately coarse, sizing it with rosin, starch or sodium silicate will help to eliminate fuzz trouble and will permit the production of a well finished sheet of paper; but here again, the effect of the sizing can be spoiled by too rapid drying.

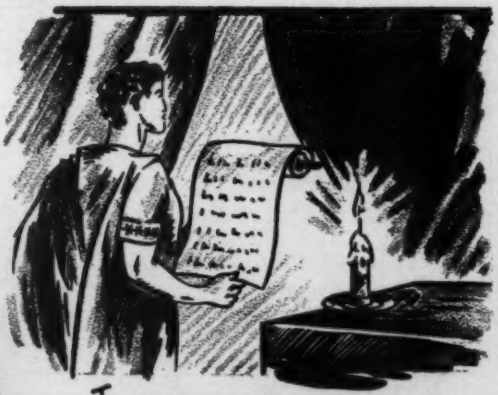
Paper Sketches---

SO JEALOUS OF THEIR COLONIAL BRETHREN WERE BRITISH PAPER MAKERS THAT THEY ONCE PETITIONED THE BRITISH GOVERNMENT (IN 1731) TO CURB THE ACTION OF MASSACHUSETTS' LEGISLATURE IN PASSING A RESOLUTION ENCOURAGING PAPER-MAKING IN THAT COLONY.

THOMAS HOWARD

THE FIRST PAPER EVER MADE WEST OF THE MISSOURI RIVER IS SAID TO HAVE BEEN THE CRUDE, HAND-MADE PRODUCT TURNED OUT BY THOMAS HOWARD, JUNE 15, 1854, IN A MILL NEAR SALT LAKE CITY. THIS MILL, BUILT BY MORMONS AND EQUIPPED WITH A BEATER MADE FROM A BEET GRINDER BORROWED FROM A LOCAL SUGAR FACTORY, WENT OUT OF BUSINESS SIX MONTHS LATER WHEN THE SUGAR MANUFACTURER DEMANDED THE RETURN OF HIS BEATING EQUIPMENT.

TISSUE PAPER IS UTILIZED IN THE MAKING OF THE COMPASSES USED ON THE "QUEEN MARY," BRITAIN'S NEWEST OCEAN LINER. THESE DELICATE COMPASSES HAVE DIALS WITH RIMS AND HUBS OF ALUMINUM, A FRAMEWORK OF FINE SILK STRANDS, AND DIAL FACES OF TISSUE PAPER PASTED CAREFULLY ON THE FRAMEWORK PIECE BY PIECE. THIS UNUSUAL CONSTRUCTION CAUSES THESE INSTRUMENTS TO MAINTAIN ABSOLUTE ACCURACY IN ALL PARTS OF THE WORLD.



THE CANDLES OF ANCIENT ROME WERE MADE OF PAPYRUS WHICH WAS DIPPED IN PITCH AND COVERED WITH WAX.

How a Paper Mill Saved Over $4,300 Monthly

I. M. Hilliard, Chief Engineer
American Boxboard Company

ACCURATE records covering eighteen months' service show that the American Box Board Company saved more than $4,300 each month as a result of: (1) complete electrification of No. 1 mill, and (2) saving in steam by virtue of installation of a new 3000 kw. bleeder turbine which replaced three small turbines and three steam engines previously used. The monthly saving is based on a comparison with operating costs of 1932 and 1933. At this rate, the complete plant modernization will pay for itself within four years out of savings.

The savings have accrued from: (1) the reduction of pounds of coal burned due to the reduced steam demand of the new turbine; (2) the reduction in radiation from steam pipes due to the elimination of a large amount of piping required for the former prime movers; (3) the reduction of steam exhausted to the atmosphere in warm weather; (4) the reduction of condensed steam in winter as well as the more efficient utilization of heat from exhaust steam and (5) the operation of the beaters and jordans with individual motors thereby reducing the losses when any of the beaters or jordans are out of service.

After the modernization, a decided reduction in steam consumption for all the mills was brought about as illustrated on chart (Figure 1). Before the new equipment was purchased, the average load ranged around 1900 kw. This was about the maximum capacity of the old equipment. Since that time the load has increased to 2400 kw. and in mid-winter with this load the bleeder steam requirement is approximately 42,190 lb. per hour. This shows a reduction of 25,000 lb. per hour below the very best operation ever obtained with the old equipment even at a smaller load. In summer, without being required to heat the mills and with a 2300 kw. load the steam bled is around 28,000 lb. per hour. It is evident, therefore, that there has been

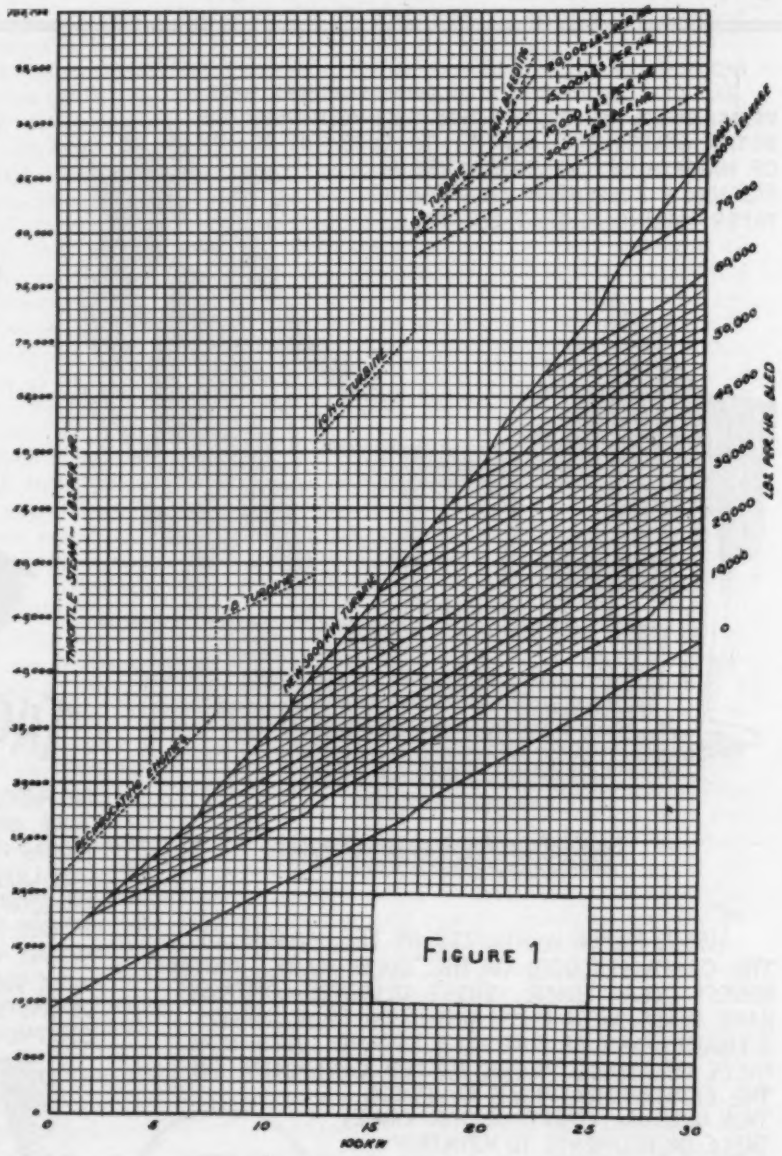
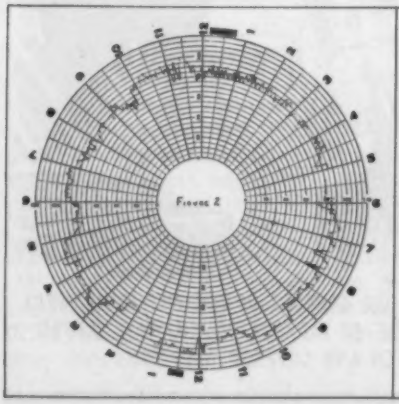
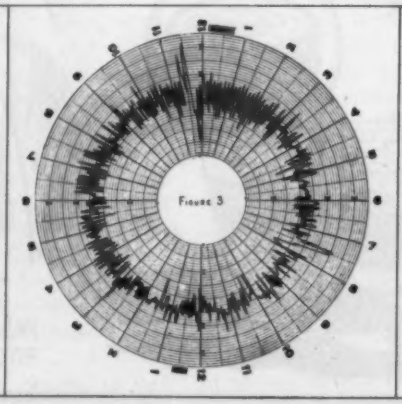
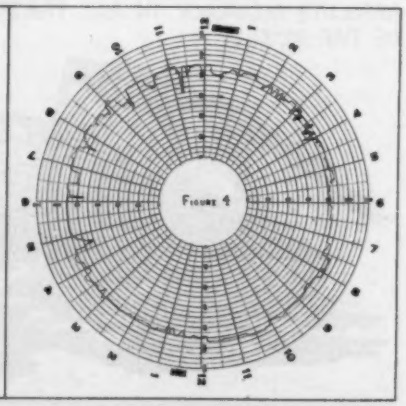


FIGURE 1







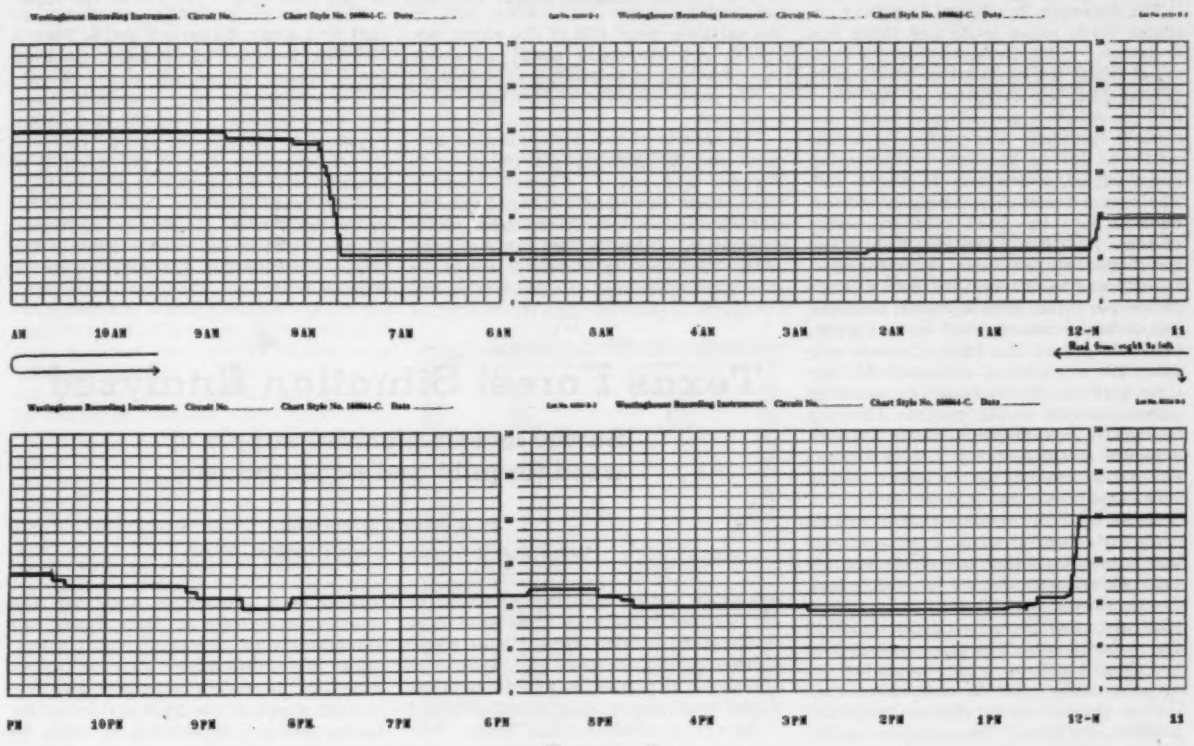


FIGURE 5

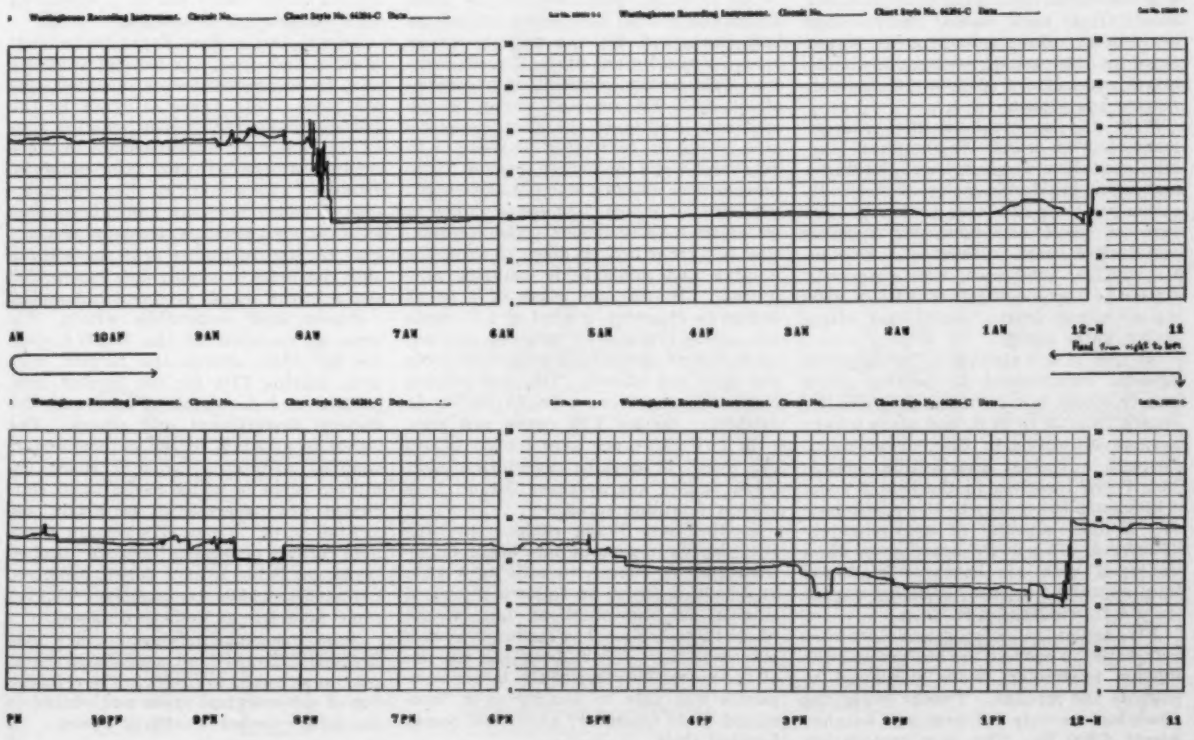


FIGURE 6

an average saving of from 28,000 to 38,000 lb. per hour, over the previous plant operation.

The American Box Board Company operates three paper mills and three box divisions. Prior to September 10, 1934, all of these divisions were electrically driven with the exception of the No. 1 mill in which a six-cylinder board machine is operated. The equipment in this mill was driven by three reciprocating non-condensing engines 25 years old. The steam from these engines was exhausted into the back pressure steam system. The No. 2 and No. 3 mills and box factories had been electrified previously and were furnished with electric power by three Westinghouse turbines, one a high-pressure, 750 kv.-a. turbine exhausting into the back pressure system; one a 750 kv.-a. automatic bleeder type turbine, which could be operated either straight condensing or bleeding to furnish low pressure steam to back pressure steam system; and finally one 625 kv.-a. condensing turbine. All of these turbines were 20 years old.

Early in 1934, the management of this company asked for a list of replacements and a report on the cost of placing the old turbines and engines in good operating condition. This was made, but a plan also was presented recommending the replacement of the three engines and the three turbines by one large turbine large enough to handle the entire load.

The electric power factor presented another problem. The system power factor was 81.5 per cent and inasmuch as the principal electric load is the beater and jordan motor load, it was felt that by eliminating synchronous motors and low-speed, squirrel-cage motors and substituting high speed, squirrel-cage gearmotors, the original power factor could be maintained without the additional expenditure of power factor correction equipment.

With the approval of the management, a 3750 kv.-a. Westinghouse turbine generator was purchased, having a maximum bleeder capacity of 80,000 lb. steam per hour and large enough to take care of plant expansion for approximately five years. Likewise, a 1950 sq. ft. surface condenser was suspended from the turbine together with a 3200 g.p.m. motor driven centrifugal circulating water pump.

At first it was planned to increase the present switchboard by adding more panels which in turn would increase the length from 20 to 30 ft. and cause a very serious crowding in the engine room. Instead, a special distribution switchboard was installed in the beater room which supplied energy to 12 circuits having a total capacity of approximately 1500 kv.-a. This switchboard, even when equipped with air breakers of 20,000 amp. rupturing capacity occupied a space only 4 ft. wide and 3 ft. deep.

Five individual 60-hp. gearmotors were purchased to operate the beaters and five 100-hp. gearmotors were purchased to operate the jordans. Twenty years ago these motors were 5 ft. high and weighed about 4,000 lb. The new motors are about 2 ft. high and weigh 1,500 lb. Finally the paper machine was provided with a constant speed, 125-hp. motor and a motor-generator set to supply direct current energy to a variable speed direct-current motor for taking care of the variable speed end of the paper machine. An electronic speed regulator was installed to reduce speed variation in the paper machine to less than ½ of 1 per cent.

The results of the modernization program can be visualized by referring to Figures 2, 3 and 4. Figures 2 and 3 were steam flow charts taken from two meters which measured the total steam production of the boilers on April 11, 1934. The chart in Figure 4 shows the total steam produced two years later and the 30 per cent reduction made it possible to measure the flow on one meter instead of two.

The intangible results are shown in part by a study of charts 5 and 6. Figure 5 shows the speed of the paper machine for a 24-hour period and shows the absolute uniformity after a definite speed has been selected. Note the short time required to change the speed from 150 ft. per minute to 45 feet per minute. It is possible in 20 minutes to change from a fiber board 16 mills thick to one 50 mills thick with practically no waste. Figure 6 shows the power input to the paper machine for the same time as Figure 5.

Texas Forest Situation Analyzed*

Survey reveals plentiful supply of wood for pulp and paper industry

E. O. SIECKE, Director,
Texas Forest Service, College Station, Texas

TEXAS, with a land area of about 168 million acres, has a forested area of about 35 million acres. The major portion of the forested area should be considered as protection forests, with the commercial forest area being confined to the region known as East Texas. Commercial forests within this region cover about 12½ million acres, 80,000 acres of which may still be classed as virgin forests.

The present condition of the East Texas commercial forest area is perhaps best portrayed by the recent survey made by the United States Forest Service. This survey, while it only covered about 6,600,000 forested acres in the southern portion of the East Texas region, gives an indication of what is to be found over the entire region. The average acre shows a stand of 12.64 cords per acre, of which 7.32 cords range in size from 6 to 12 inches. The information is further broken down to show the pulping and non-pulping volumes now present. In the size class of 6 to 12 inches in diameter, a total of 5.37 cords per acre is given as suitable for pulping, while for 13 inches and over, 3.54 cords per acre are shown. The non-pulping class, ranging from 6 to 12 inches in diameter, carries 1.95 cords per acre, with 1.78 cords per acre for 13 inches and over. It must be remembered that these figures are averages for an area of over 6 million acres.

In the East Texas region, sawmills still play an important part in the industrial life. Of course, we still have some mills which insist on following the old suicidal logging practices, but on the whole there is a marked tendency toward management which will prolong the life of the operation. One of the larger companies was able to qualify as a "Sustained Yield Operator" under the recent Lumber Code.

With continued and more intensive fire protection, and still more improved logging and lumbering practices, the commercial forests of East Texas can undoubtedly be depended upon to continue their importance in our industrial life. In addition the area can support its quota of the pulp and paper industry which is beginning to make its appearance. The Forest Service Survey indicates that today there is available some 30 million cords of wood suitable for pulping with a balance of some 70 million cords which can be allocated to other wood-using industries.

Growth in the East Texas timber belt is estimated, from our present information, to be approximately one-half cord per acre. This figure is given as the average under the present existing conditions, but with improvements in these conditions, the growth rate could be doubled. The rainfall in this area averages 50 inches per year, and this coupled with the long growing season, plus a soil well adapted to timber growing will enable the area to supply her reasonable share of the forest products industries.

Forest land ownership within this area, as reported by the U.S.D.A Census for 1935, credits the farmer with 23%, leaving 77% for the lumber companies, land development concerns, the Federal Government and others. The purchase program of the government is confined to a gross area of about 1½ million acres, of which the ultimate purchases are expected to be about one million acres. There still remain desirable areas of second growth timber lands, available to new forest products, industries, which are sufficient to give some security to their investment.

Steps are being taken toward a program of planned land use. Such a program is expected to result in the reforesting of sub-marginal areas and adding to the future timber wealth of Texas.

(*) From May, 1936 issue of *Manufacturers Record*.

Some Papermaking Equipment Observations*

HARRY E. WESTON[1]

THE past several years have seen an era of new equipment development and improvement in design of existing equipment that has been little short of miraculous. For years past the leading equipment manufacturers have been alert and have continued to offer machines and mechanical devices for the improvement of process operations; but it is believed that outside of the revolutionary changes brought about first by the introduction of the Hollander, later by the paper machine, and still later by the several wood pulp processes that there has been more effort placed by equipment manufacturers in seeking out what the manufacturers of pulp and paper require to make their plant operations more efficient and in attempting to develop equipment to meet the requirements of their findings since that day of 1929 when business received its severe jolt than in any similar period of time previously. It is not believed that this effort on the part of the equipment manufacturers has been altogether altruistic, but rather it has been a means of stimulating business. In some cases, it appears that the desire to live actually prompted it. Nevertheless, as a whole, it has been good for the pulp and paper making industry and is tangible evidence of progress.

The development activity of only the past two or three years, although perhaps not carried on at quite such a feverish heat as in the few years immediately preceding, has resulted in advancement that is worthy of mention. On the part of numerous equipment manufacturers there has been a conscientious desire to apply their knowledge more intelligently

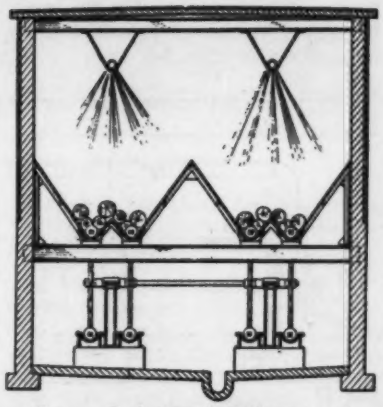


Fig. 1—End elevation diagram of pulpwood thawing conveyor

in meeting mill requirements as they exist today, and effort has been placed in that direction. In some instances, the effort has not yet been revealed generally to the trade as the developments are still in a nebulous state and may not materialize for some time to come. In other cases, the developments have consisted of only minor changes in the design of equipment that had been introduced previously. Then, too, some developments have been entirely new and the possibilities of some of them can hardly be prognosticated.

Wood Preparation Machinery

One wood preparing equipment design change has included the substitution of a gearless-elevator type motor drive with regenerative braking for a steam engine on a log carriage for cutting logs into cants. This arrangement at times of high speed production must accelerate the carriage and log (often exceeding 16 tons in combined weight), stop this high inertia load, and reverse it to starting position once every seven seconds. High-speed deceleration is made possible by the regenerative braking. A shoe-type auxiliary brake is used only when the carriage is stopped and not under normal cutting or reversing operation.

Announcement also has been made of a design of thawing conveyor for pulpwood (Figure 1). This apparatus, designed to remove frost from the pulpwood during the winter season prior to barking, consists of a system of hot water showers and a well-insulated building in addition to a conveyor system. The building houses, the shower system, and a large part of the conveyor system—the arrangement being such as to permit boiling hot water to be showered on the frozen wood as it is conveyed through the building and the spilled water being returned to a heater.

Improved designs of barking drums (Figure 2) also have been announced. One design has been arranged to handle full length logs either continuously or intermittently. Another utilizes a series of wrought iron or steel pipes in place

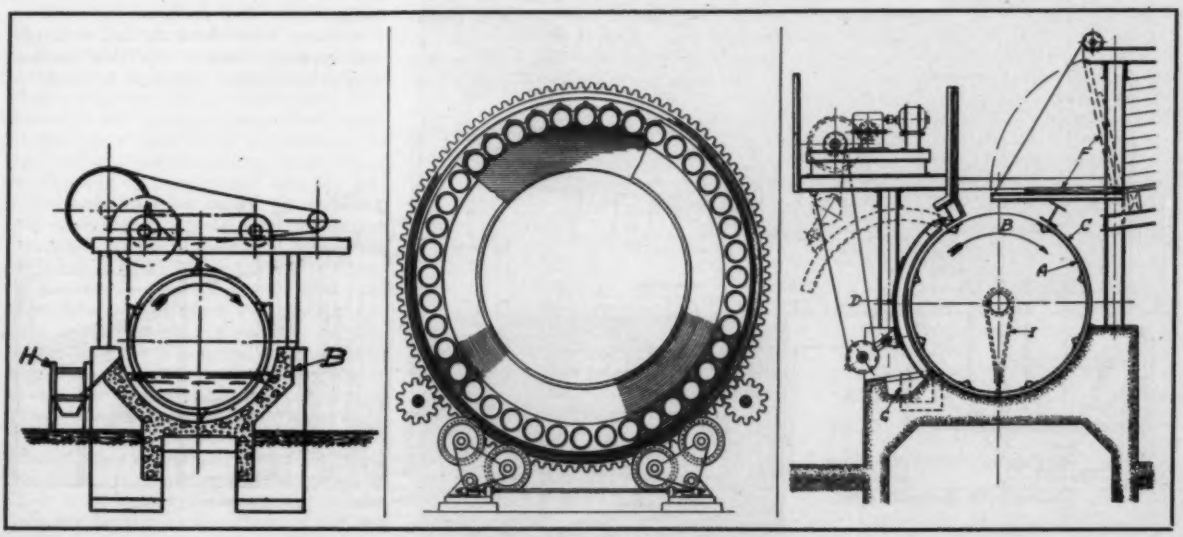


Fig. 2—Continuous and intermittent barking drums of recent design

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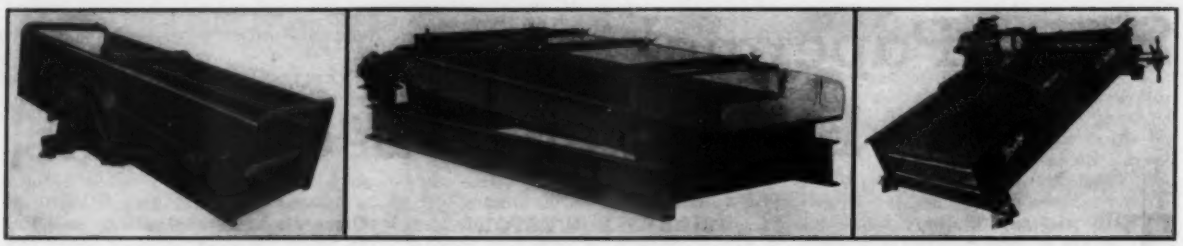


Fig. 3—Three different designs of chip screens

of the conventional channel irons and U-bars in the construction of the drum without resorting to the use of bolts, rivets, or welds. In each case, the development has been made to improve barking drum efficiencies and to decrease maintenance.

Several different designs of screens according to some evidences than the screens ordinarily employed a few years ago. Power requirements also are less; and, when contrasted with the usual reciprocating type of screen, the newly introduced designs produce little or no noticeable floor vibration.

for circulation of the cooking liquors during the cooking operation might be cited as comparatively recent advances in equipment development for improving the conditions of pulping and for the promotion of greater operating efficiencies.

As to improvements or innovations in

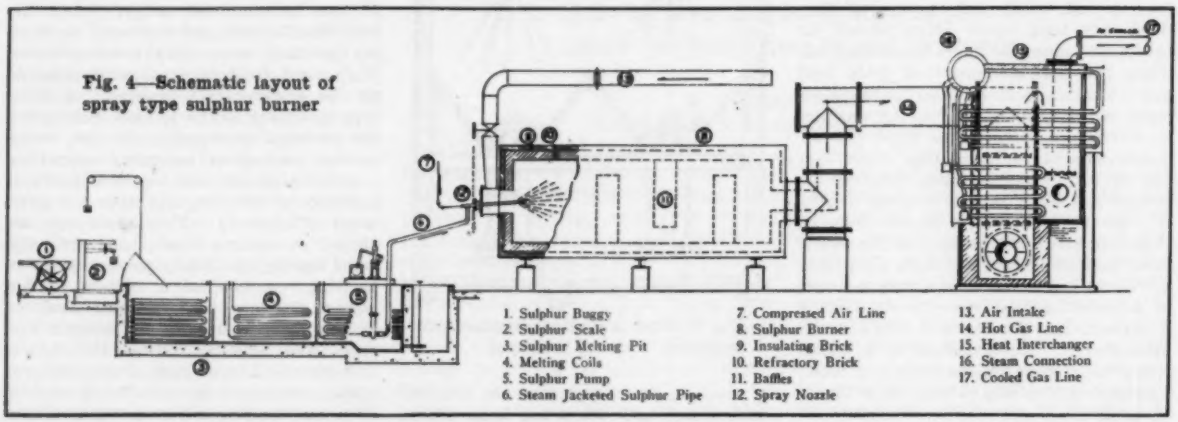


Fig. 4—Schematic layout of spray type sulphur burner

1. Sulphur Buggy
2. Sulphur Scale
3. Sulphur Melting Pit
4. Melting Coils
5. Sulphur Pump
6. Steam Jacketed Sulphur Pipe
7. Compressed Air Line
8. Sulphur Burner
9. Insulating Brick
10. Refractory Brick
11. Baffles
12. Spray Nozzle
13. Air Intake
14. Hot Gas Line
15. Heat Interchanger
16. Steam Connection
17. Cooled Gas Line

used in various industries have been adapted to the screening of chips and have shown interesting results. These screens (Figure 3) are smaller in size, quieter in operation, and have greater capacity and do a better screening job,

Pulping Equipment and Process Improvements

Advancements likewise have been made in equipment methods for pulping, in the development of equipment for the production of cooking liquors, and in the development of processes and equipment for the utilization or recovery of the liquors following digestion of the wood. Mechanical feeders for filling digesters with chips, equipment for impregnating chips with liquor in the case of the sulphite process, and equipment

methods for pulping, particularly in reference to sulphite pulp, attention might be called to several lines of activity.

One would be improvements in the technique of a method for recovering hot SO_2 gas and liquor under pressure and supplying the cooking acid to the digesters at a relatively high initial temperature and pressure.

Another would be a method of simplified cooking control. In this method, steam entering a digester is made to

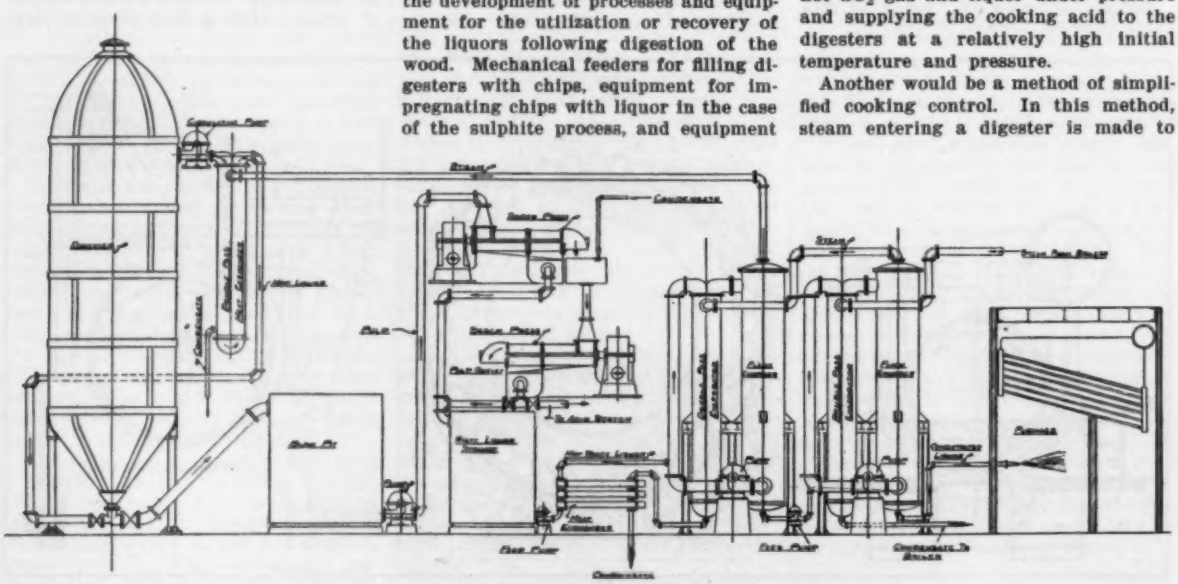


Fig. 5—Diagram of process for spent sulphite liquor utilization

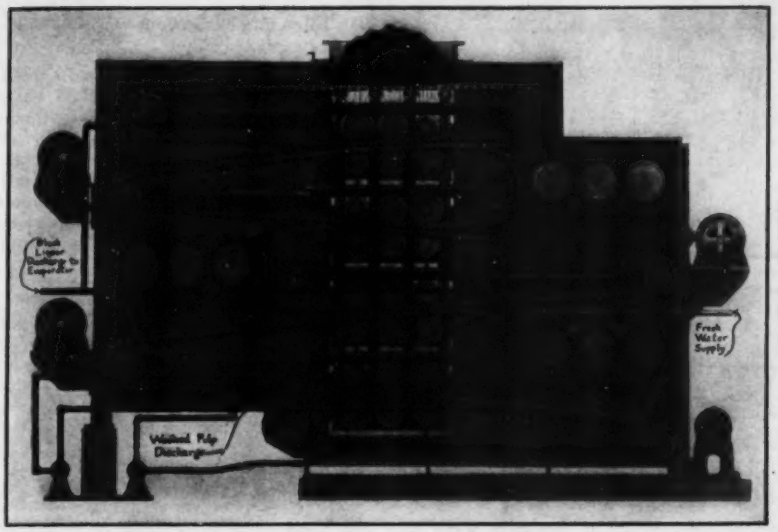


Fig. 6—Sectional view of pulp washing press

pass through an orifice of a size that will give the desired maximum temperature in a given time. When this temperature is reached, the valve to the orifice is closed, and a valve to an orifice of smaller dimensions opened to maintain the temperature for the balance of the cook. A pressure control valve, placed on the main relief line, maintains uniform pressure on all digesters.

A third innovation in the cooking of sulphite pulp is a method through which the relief from a digester is passed into a closed storage tank which also acts as a separator and from which the gas goes direct to reclaiming tanks without being cooled, the hot liquid in the separator being used in part for meeting the acid requirements of a digester charge.

A continuous cooking system might be mentioned as a fourth innovation. This system consists in having a digester built of such a height that a temperature of about 125° Fahr. can be maintained at the bottom. The chips are put into the digester by means of a worm conveyor while the acid enters continuously near the top. The cooked pulp flows from the bottom to a level control tank near the top of the digester from where it goes to a dewatering apparatus. At this point a portion of the spent liquor is removed and circulated into the bottom of the digester to aid in removing the cooked pulp. From the dewatering equipment the pulp goes through a series of screw presses where the waste liquor is removed, put into a storage tank, and then to a double effect evaporating system where steam for cooking is generated and the concentrated liquor then burned under the boilers to produce steam for evaporating and other purposes. The acid, made in the usual manner, mixes with the steam from the second effect evaporator in a flash chamber where the sulphur dioxide is separated from the liquid and then passed into the bottom of the digester, the hot acid being passed to the top. Fifty tons daily production with one digester is cited as a possibility for this system which, it is understood, has passed the experimental stage.

Acid Making and Spent Liquor Utilization

A sulphur burner (Figure 4) and a system for producing sulphite cooking acid with pulverized limestone rather than with chunks of limestone or with burned lime are two of the developments that might be mentioned in connection with sulphite acid making.

A pit for melting and storing the molten sulphur, a metering pump, an atomizing device, and a waste heat boiler are tied in with the burner in making a complete installation. As the molten sulphur enters the burner proper, which is a horizontal cylindrical steel tank lined with insulating and refractory material and equipped with suitable baffling, it is atomized with a small amount of compressed air at 60 to 90 pounds pressure. The atomized sulphur burns rapidly and produces temperatures of from 2,400 deg. to 2,700 deg. Fahr. The waste heat boiler is stated to produce steam at a minimum rate of 2,500 pounds per hour at 190 pounds pressure at a combustion rate of 12 tons of sulphur per 24 hours and with feed water at 212 deg. Fahr.

The system for using pulverized limestone in the production of sulphite acid employs a method of pulverizing the rock to a fineness that will pass through a 300 mesh wire. It is suggested that at this fineness the material will practically stay in suspension like burned lime.

The utilization of spent sulphite liquor, one of the most baffling and intriguing problems of the sulphite industry for a number of years, has remained in the limelight and only recently a commercial sized plant has been put into operation at one of the midwestern mills to utilize it. At the same time, some publicity has been given to another process (Figure 5) for the evaporation and combustion of waste sulphite liquor by which, it is stated, a mill can manufacture and dry sulphite pulp without depending on any substantial source of fuel other than the lignin removed from the wood in the cooking process.

Some work also has been done on recovery equipment for the alkaline pulping processes. For example, considerable progress has been made in improving the design of black liquor evaporators. The tendency in this re-

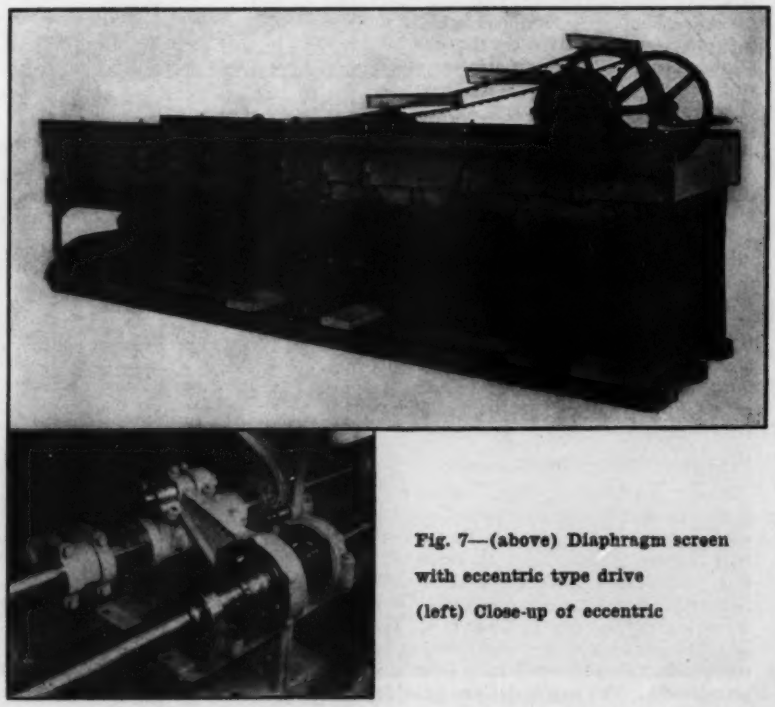


Fig. 7—(above) Diaphragm screen with eccentric type drive
(left) Close-up of eccentric

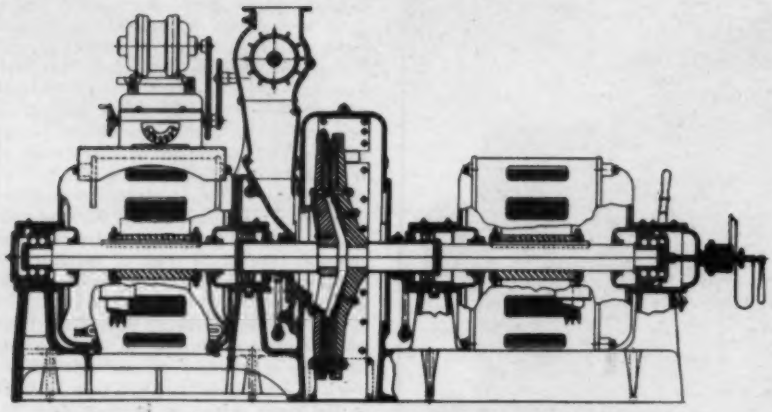


Fig. 8—Sectional view of attrition mill of double disc type

gard has been toward the use of forced circulation high concentrators to concentrate the liquor to approximately 60-70 per cent total solids. Then, too, there have been improvements in several processes for the recovery of chemicals and heat from kraft and soda black liquors.

Pulp Washing and Screening

One development, perhaps older than most of them which have been mentioned and yet one that is not so well known to the trade as a whole, involves the design of a pulp washing press. This press (Figure 6) is a combination of conveyors, presses, showers for washing, and hackling or teaser rolls which together make for rapid washing of the stock with little dilution of spent liquors. It has a capacity for handling about 50 tons of pulp per day.

There have been some comparatively recent improvements in screen plate design, and some tests are being conducted on the use of chrome nickel steel for this purpose. Tentative conclusions indicate that plates of chrome nickel steel will prove highly satisfactory.

At the same time, there have been some innovations in pulp screen design —both in revamping some of the older designs and in bringing out completely new types. Probably the most outstanding modernization job has been done with the diaphragm type of unit (Figure 7). An eccentric type drive assuring positive, uniform stroke of the diaphragms has been substituted for the older type of drive. Metal vats may be had in place of wood. Screen height has been lessened, and numerous other improvements made. Power requirements for several of the improved designs approximate 1/10 hp. per plate.

Thickening Equipment Changes

There also is being offered a three-roll hydraulic wet machine combined with a vacuum cylinder instead of the conventional open cylinder and at least one improved design of decker that is said to handle up to 120 tons of sulphite from screening consistency to 5 per cent. Insofar as cylinder mould construction is concerned, there likewise have been improvements. The newer designs provide more strength with the same weight of materials.

A new design of vacuum filter embracing bronze, Monel, cast iron, stainless steel, and all rubber covered construction is finding application within the industry. A rubber covered vacuum machine for washing stock after chlorination and before neutralizing has been installed in a number of mills. Then, too, an auxiliary vacuum press has been incorporated into the design of a vacuum machine to receive the sheet from it and bring the consistency up to 18 or 20 per cent for subsequent high density bleaching.

At this point, it might be mentioned that a double agitator type mixer with certain refinements is finding application for opening up stock as it comes from the filters or thickeners and for blending such stock with bleach liquor.

Some Refining Equipment Developments

Equipment for the refining of screenings, and of raw or semi-cooked chips and for the defibering and treatment of old paper stock and broke as well as various kinds of pulp took several lines of development. The attrition mill (Figure 8) of both single and double discs types, neither of which are particularly new to the pulp and paper industry, have been studied more carefully and more is known about handling it and about what it will do.

Fig. 9—Combination defibering and high density screening unit showing interior construction

In the newer developments of equipment and methods for the treatment of old paper stock and broke as well as various kinds of pulp is a combination defibering and high density screening unit, a high density pulper, a combination high density pulper and refiner, a

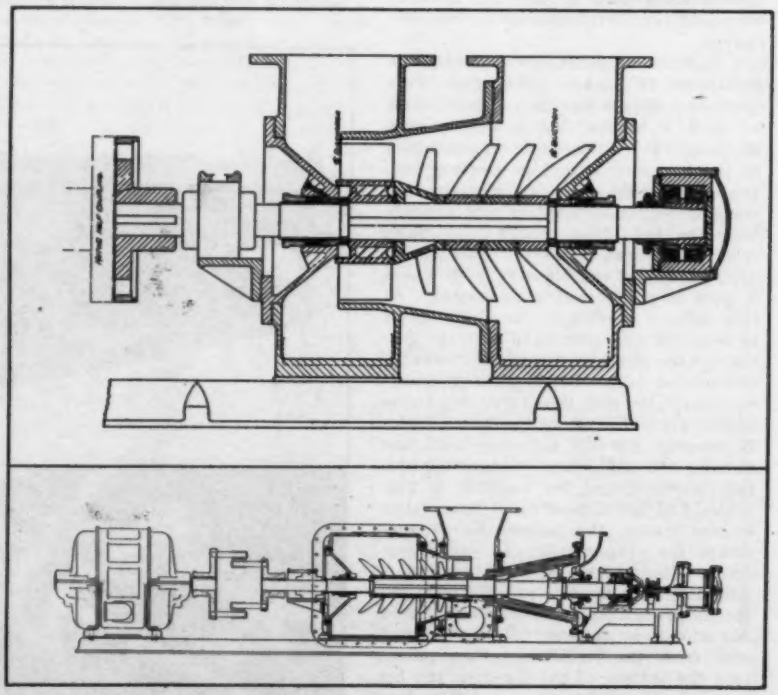


Fig. 10—(above) High density pulper and (below) combination high density pulper and refiner

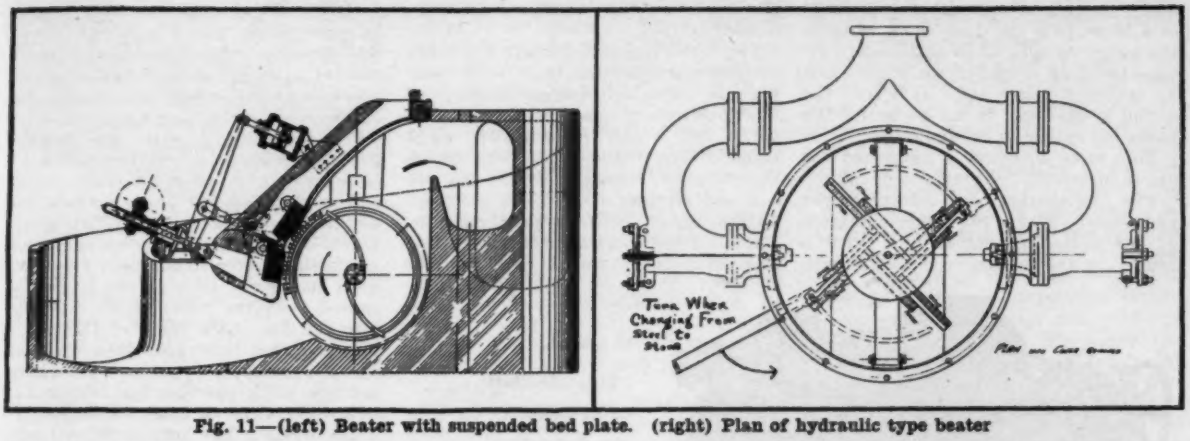


Fig. 11—(left) Beater with suspended bed plate. (right) Plan of hydraulic type beater

broke reclaiming unit, and a system designated as hydraulic beating.

The combination defibering and high density screening unit (Figure 9) was originally designed for handling mixed paper stock for board mills. In addition to defibering and screening such stock, it removes long trash such as cellophane, rubber bands and rags as well as metal and dirt.

The essential elements of this device are two circular perforated discs or screens which are clamped in a case much like the elements in a filter press. A four-blade stainless steel impeller is arranged to rotate between these screen plates. Mounted on the paddle blades are hinged scrapers or wiper blades which are held out by centrifugal force and the pressure of the stock so that they are in light rubbing contact with the screen plates. This action causes the bundles of fibers that are entrapped in the screen perforations to be brushed out and forced through as accepted stock. The heavy materials as well as rags, rubber bands, and the like are thrown to the outside as rejects and ejected from the machine. There is sufficient pressure set up by the impeller to pump these rejects a considerable distance—usual practice being to discharge to a detrashing unit located over a settling trough where acceptable fibers rejected with the trash are recovered and returned to the inlet of the defibering and screening unit where they are passed through the machine again. This recycling is continued until the fibers are reduced sufficiently to pass through the screen perforations, preferably ⅛-inch holes, as accepted stock.

The high density pulper (Figure 10) consists of a large tub of cast iron, steel or wood with a midfeather and a steep, sloping bottom; a series of breaker arms; and a high capacity low head impact impeller pump. The pulper, made in whatever size required, is built for batch operation and to pulp at consistencies up to 12 per cent.

Stock, fed to the pulper in much the same manner as in filling an ordinary beater, is subjected at the low point of the circuit to both breaking and defibering action prior to its elevation by the impact impeller pump to the upper level of the tub. So efficient is this breaking

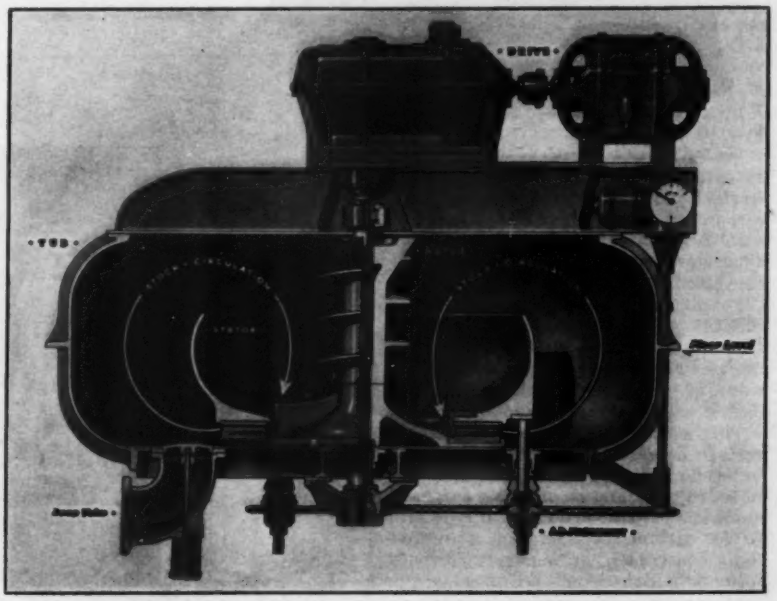


Fig. 12—Diagram showing operating principle of vortex-type beater

Fig. 13—View of vortex-type beater installation

and defibering action that a single pass of a sheet pulp one inch thick through the pulper is said to be sufficient to reduce the pulp to pieces not larger than an ordinary finger nail. Likewise, the action is said not to cut or bruise the fibers but rather to debundle them.

This same machine is suggested for use in bleaching, coloring and de-inking.

The combination high density pulper and refiner (Figure 10) is a combination of the preceding pulper unit with a refiner of the jordan type so designed as to keep the stock from channeling straight through. This refiner is incorporated into the pulper design in such a manner that it receives under a constant head about 10 per cent of the stock from the circulating pump, the remainder being returned direct to the tub. A portion of the discharge from the refiner may be bled off and the rest returned to the tub for circulation; or the entire discharge may be passed back to the tub.

This combination unit, designed to replace breakers and beaters, is stated to be adaptable for use on all liner stock in board mills and on sulphite, sulphate, and soda pulp. Furthermore, it is said to be capable of operation at either light consistency or heavy consistency (up to 10 per cent), according to the results desired.

The broke reclaiming unit, in general, comprises a collecting chest with slanting side walls, a disintegrator unit, and a two-chamber compartment for the partly and wholly reconditioned stock respectively. White water fed through shower pipes, arranged both at the ceiling and on the side walls of the collecting chest, moistens the broke immediately upon its entrance to the chest and gives it a thorough soaking. The soaked broke, through a current created by a circulation pump, is moved toward the disintegrator unit where rotary breaker arms reduce it to small pieces. Stock particles sufficiently broken up by the disintegrator pass on through a coarse rake into the coarse stock chamber from which a circulation pump returns it to the collecting chest at the end opposite to the one at which the disintegrator unit connects. This pump exerts a defibering action on the stock and disintegrates it sufficiently so that upon its return through the system it passes from the coarse stock chamber into the fine stock chamber through a fine rake that is between them. A centrifugal pump draws the stock from the fine stock chamber and delivers it to a broke chest or machine chest.

The system has been developed primarily to handle large quantities of dry broke which sometimes accrue on modern fast running paper machines, particularly newsprint machines.

The hydraulic beating system, a combination of a hydraulic refiner (Figure 11) and a specially designed centrifugal pump which together are tied in with a breaker or broke beater has been introduced for the defiberization of broke, mixed papers, and pulp as well as for hydration. For defibering of broke and waste paper, because of two opposing nozzles in the refiner and the ability of the pump to continuously maintain high critical nozzle pressures, stock meets stock at approximately 100 feet per second nozzle velocity. For hydration effects, the stock from the nozzles is impinged against plates that are equipped with a steel or stone filling. In either case, the hydraulically refined stock drops into a circulating chest that is located directly below the refiner and from which it is discharged to chests or beaters.

It is claimed that the treatment accorded stock by this system will thoroughly pulp the toughest broke with low power; and that when the hydrating plates with steel or stone filling are used, jordans and refiners in most cases can be eliminated.

Fig. 14—(left) Jordan-like stock-treating machine

Fig. 16—(right) Fourdrinier part with shake applied to wire through breast roll and shake roll

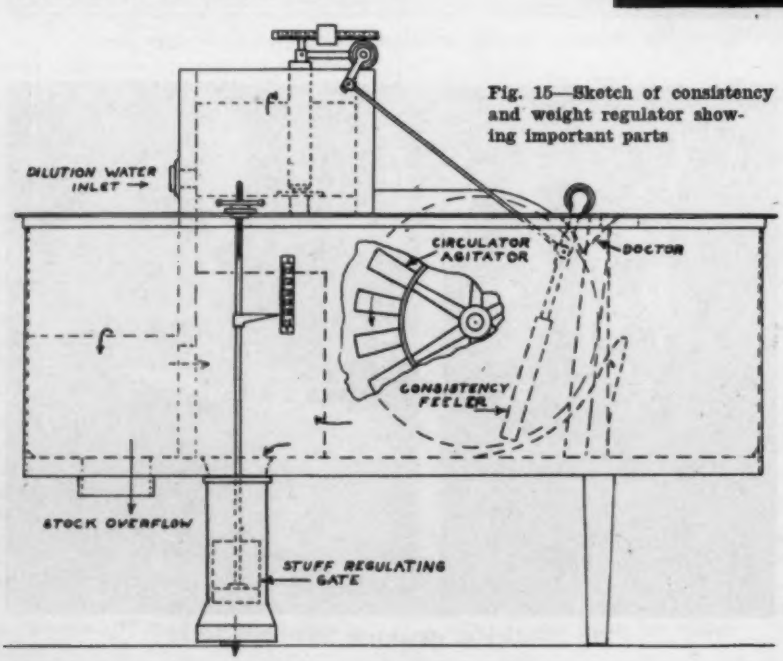


Fig. 15—Sketch of consistency and weight regulator showing important parts

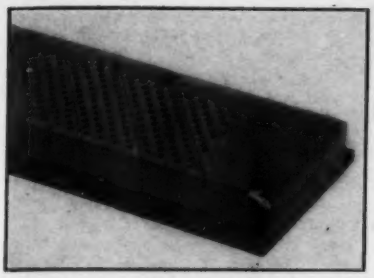


Fig. 17—View of suction box cover

Other Developments of Stock Preparation Equipment

There also have been other developments in stock preparing equipment during the past few years. For example: There has been the introduction of a beater with beater roll that rotates in the direction opposite to that of the conventional Hollander type beater and with bed plate that is suspended at a point above the roll and controlled by means of air pressure. There has been the work on the beater that circulates its stock vortex-like. There has been the development of a jordan-like unit to be operated either as a continuous unit in the line or as a batch unit with a beater. There has been the development of a new type of jordan plug. There has been work on another machine, as far as is known not yet officially announced, which it is understood retains the desirable features of the beater with respect to the drawing out of fibers but with new features incorporated in its design that will make one small unit capable of producing results equivalent to 5-10 beaters with only a fraction of the power input load.

The beater with the air-controlled bed plate and reverse traveling roll (Figure 11), which by the way turns in fixed bearings, may be of cast iron, cast iron tile lined, concrete, or concrete tile lined construction. It is available in sizes ranging from 700-2000 pounds capacity at 8 per cent consistency.

Three essential elements comprise the beater with vortex-like circulation (Figures 12-13)—a motor driven rotor, an inner bowl or stator, and an outer bowl or tub. The tub is cylindrical, a 1500-lb. beater of this type taking about one-half the floor space for a Hollander of equal capacity. In the lower center of the tub is the stator which has the combined function of midfeather and bedplate. It may be raised or lowered to regulate the degree of refining action. In the center of the stator and extending beneath it is the rotor. The upper section carries a feeder screw, while the lower section corresponds to a beater roll. The screw equipped rotor circulates the stock, disintegrates it and forces it downward and outward between the refining elements of the rotor and stator where it flows up between the tub wall and the outer wall of the stator, finally overflowing into the stator bowl for recirculation.

The jordan-like stock treating machine (Figure 14) is a very compact high speed unit utilizing the principle of close clearances and high surface speeds for producing the refining action. The surface speed of the plug at the large end is approximately 6500 feet per minute. A special impeller on the small end of the plug and which rotates within a fluted orifice tube, tends to pump stock into the refining areas at the small end of the plug faster than it can be discharged at the large end. This action results in overcoming acceleration of stock through the machine. The impeller also partially neutralizes the thrust and relieves the load on main thrust bearing.

This machine, depending on service, is said to have a capacity as high as 150 tons per 24 hours with power requirements from 100 hp. to 250 hp.

The new type of jordan plug, which is said to have more than twice as much

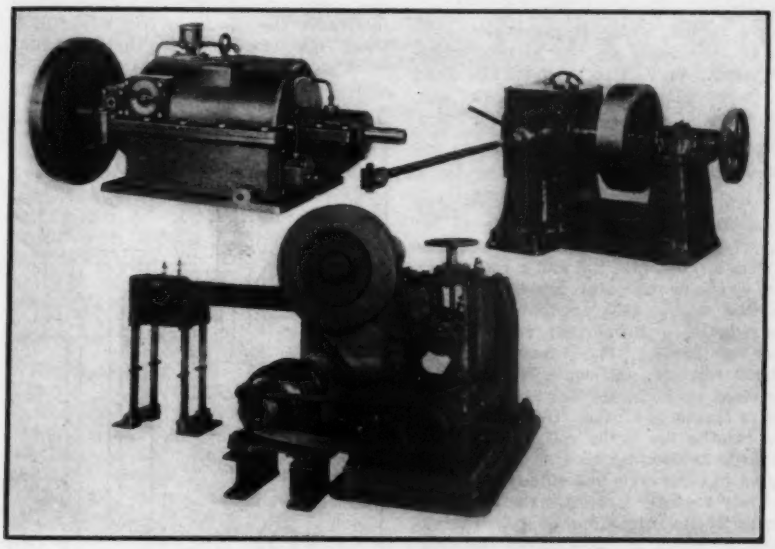


Fig. 18—Several new designs of shake heads

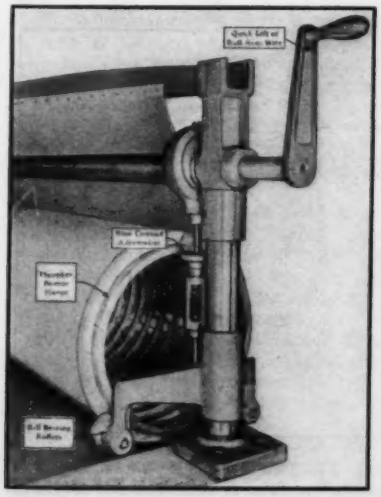


Fig. 19—View of open end type of dandy showing construction details

Fig. 20—Paper machine dryer gear arrangement with gears considerably smaller in diameter than dryers

strength, or bar support, as any conventional band type plug or any other bandless plug, can be built for any and all makes and sizes of jordans. It also is claimed that, due to the increased area of metal supporting the sides of the bars, there is correspondingly less wear in the slots, and consequently the bars stay tighter for longer periods of time.

Before leaving the subject of stock preparation, mention should be made of efforts to automatically control the work of the beater and jordan. There is work of that nature in progress at the present time, which, in case of the beater, is directed toward the development of equipment to make automatic control of adjustments of the beater roll according to a predetermined master chart without attendance of an operator and to record results attained throughout the twenty-four hours, and, in the case of the jordan, to automatically control the adjustments of the jordan and to record the results attained over a twenty-four hour period.

Then, before proceeding with paper machine developments, some comment should be made regarding consistency and weight regulators. At least three of these devices have been introduced to the market probably in as many years, and two of them are of very recent origin. Of the latter two, one regulator (Figure 15) utilizes a beater-like tub for mixing and circulating the stock by means of a motor driven agitator. Suspended in the stock is a feeler which actuates a dilution valve and thus regulates consistency, a portion of the regulated stock passing out of the regulator through a stuff regulating gate to the paper machine. The second of these

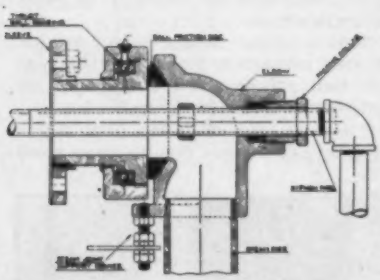


Fig. 21—Sketch of dryer steam joint with anti-friction thrust bearing and ball friction disc

latter two developments covers a regulator that is said to be accurate on consistencies as low as one-tenth of one per cent. Numerous advantages are cited for it, particularly the screening of pulp stock at proper density.

General Trends in Paper Machine Design

In addition to the actual new developments of the past few years in connection with paper machines, there has been a definite tendency for increased width of machines and increased speed on nearly all grades of paper besides news and kraft. Tissue machines are wider and running faster. Book machines are definitely thought of in terms of wider machines, and speed is becoming a factor, which is more and more being considered on the higher grades of paper. There also has been the trend to improve operation and simplify construction of both fourdrinier and cylinder machines.

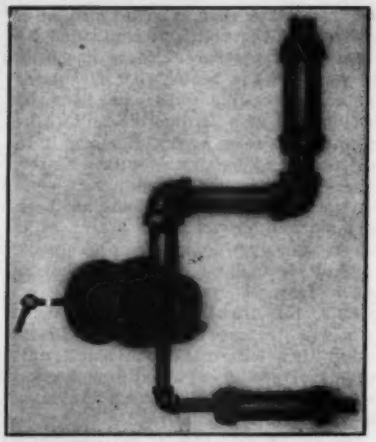


Fig. 22—Steam fit which maintains syphon pipe in fixed position at all times

Wet End Developments

Several years ago saw the introduction of a fourdrinier part (Figure 16) in which shake is applied to the wire through the breast roll and a roll known as a shake roll, introduced into the middle of the table, approximately midway between the breast roll and the suction boxes. The breast roll and shake roll are each equipped with independent shake heads that are adjustable as to length of stroke. Grip is obtained by raising the shake roll above the adjoining table rolls, and no shake is applied to table rolls and side frames.

Only recently has come the announcement of the invention of a fourdrinier part in which the axes of the tube rolls may be moved at any desired rectilinear speed in the same direction of travel as the wire. Hence, tube rolls do not rotate, if the axes of the rolls and the wire travel at identical speeds. If the axes of the rolls move slower or faster than the wire, the rolls rotate either clockwise or counterclockwise at peripheral speeds to compensate for the difference in rectilinear speed.

Among the other recent developments in connection with the fourdrinier part that might be mentioned are: stock inlet design improvements; development of a tallow-treated, end-of-grain, maple suction box cover (Figure 17); improvements in shower pipe design, renewable stainless steel spray nozzles in at least one of them; several new designs of shake heads (Figure 18) that permit adjustment in length of stroke while in operation; development of a combined wire oscillator and guide to prevent freezing of the wire on the suction boxes as well as to guide it; development of a combined automatic stretch and guide roll to relieve strain on the wire cloth; and improvements in dandy roll design (Figure 19), including open ended construction and use of anti-friction bearings, trunnions, welded and silver soldered seams, internal steam and water showers, and triangular rods and cone shaped winding wire in surface construction.

Mention also might be made, considering both fourdrinier and cylinder types of machine, of other recent wet end developments.

There have been some changes in suction roll design. In one make of roll, the operating head has been redesigned to make it more compact, to protect the operating parts, and to make it neater in appearance. Some suction press rolls have been rubber covered; and suction felt rolls have been installed on both wet and press felts for keeping them open and clean and to replace the usual suction box for the purpose.

A device consisting of a wire faced bottom roll and a rubber covered top roll, arranged for compound weighting, has been applied to cylinder machines to remove the excess or free water in a sheet right after it leaves the last mold. Such a mechanism is equipped with a slice, and a shower is placed on the bot-

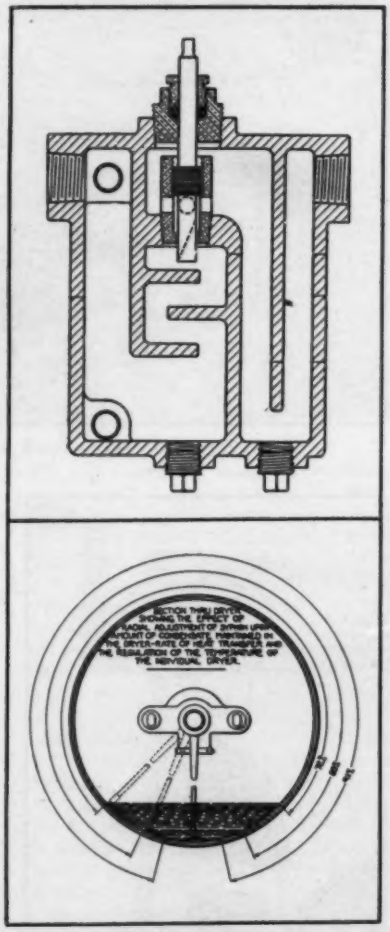


Fig. 23—Two drainage system developments. (above) A condensation drainage device. (below) An ejector nozzle at inside end of syphon pipe

Fig. 24—Panel board and electric thermometer for measuring sheet temperature on dryer of system for controlling moisture content of paper

tom roll to keep it clean. No drive or vacuum pump is required for it.

Another development is that of a roll, designated as a suction drum roll, to perform work parallel to that of the unit just previously mentioned. Its application is determined by conditions surrounding the machine, the operation desired, paper machine speed, grade of paper being made, etc.

The Dryer Section

Changes in the dryer section include a dryer gear development, a couple of new designs of steam joints, and the introduction of several new drainage systems and improvements in some of the older systems.

The dryer gear development (Figure 20) makes use of dryer gears considerably smaller than the diameter of the dryers. These are connected one to the other through pinions, and the entire arrangement enclosed.

In lubricating such a train of gears, a smaller amount of lubricant is placed on the dryer gear at the wet end of the machine. The gears themselves carry the lubricant toward the dry end, lubricating each of them as it goes along. The lubricant is picked up at the dry end, pumped over to the wet end, and used over again.

This type of dryer gear arrangement opens up space on the backside of a machine, allowing more room to the operator in removing broke, and permits the backside of the machine to be kept clean.

One of the recently developed steam joints (Figure 21) for dryers is equipped with an anti-friction thrust bearing as well as with a ball friction disc composed of graphited asbestos. This ball disc aligns the elbow with the sleeve, and the thrust bearing takes the thrust of holding these two parts together. They are connected by two bolts, each of which tightens on a spring.

The other steam joint (Figure 22), or steam fit as it is called, utilizes a flat oilless type disc with the syphon pipe remaining at all times in a fixed position with relation to the inside of the dryer. The syphon pipe is supported

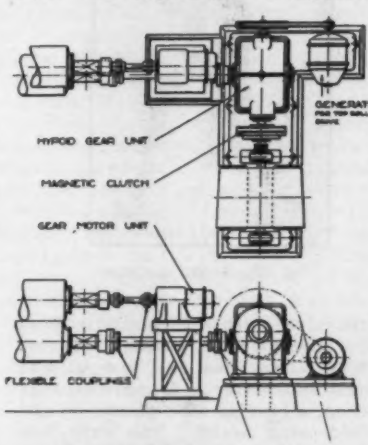


Fig. 25—Top press roll drive arrangement

at two points and is welded into the head of the joint. The joint is self-adjusting in accordance with the amount of pressure carried on the machine. Expansion and contraction is met through the use of a flexible pipe joint in the inlet and exhaust lines.

Dryer Drainage Systems

A condensation drainage device without any moving parts or air vents and with which the discharge rate depends upon the temperature of condensate water (Figure 23), has been applied to paper machine drainage, one device being installed on each dryer of a machine so equipped. It is stated that this device may be adjusted to operate on any steam pressure from 0 to 250 pounds and that it is being used successfully, when made of steel, for pressures up to 450 pounds.

Another system that has been introduced for paper machine drainage (Figure 23) places an ejector nozzle at the inside end of each syphon pipe. This nozzle sucks up the condensate from the dryer, retards the flow of steam (due to restricted area of orifice), and automatically sets up a pressure differential between the inside of the dryer and the condensate header which causes the condensate to flow out of the dryer. The amount of accumulated condensate in the dryer may be controlled by adjusting the radial position of the syphon.

A third new system (Figure 24) has been introduced as a means of controlling the moisture content of paper. In this system, the sheet temperature is measured by a sensitive electric thermometer and the temperature impulse communicated through a potentiometer and pressure transformer to a steam-flow control unit which acts to maintain a ratio between the flow of steam into the dryers and the moisture content of the sheet.

Improvements in the older systems include the development, in one case, of two new systems, one for high pressure paper machines and the other for low.

The high pressure system is applicable to machines in which the steam pressure used for drying ranges anywhere from 5 to 50 lb. The operating principle is said to be similar to that of a steam turbine in which the steam is expanded

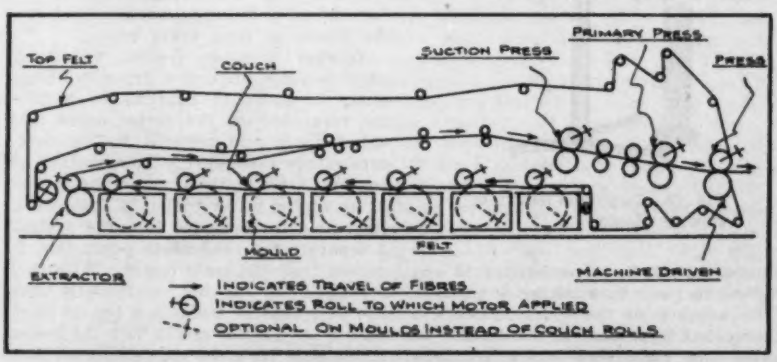


Fig. 26—Elevation sketch showing typical drive arrangement of cylinder machine wet end

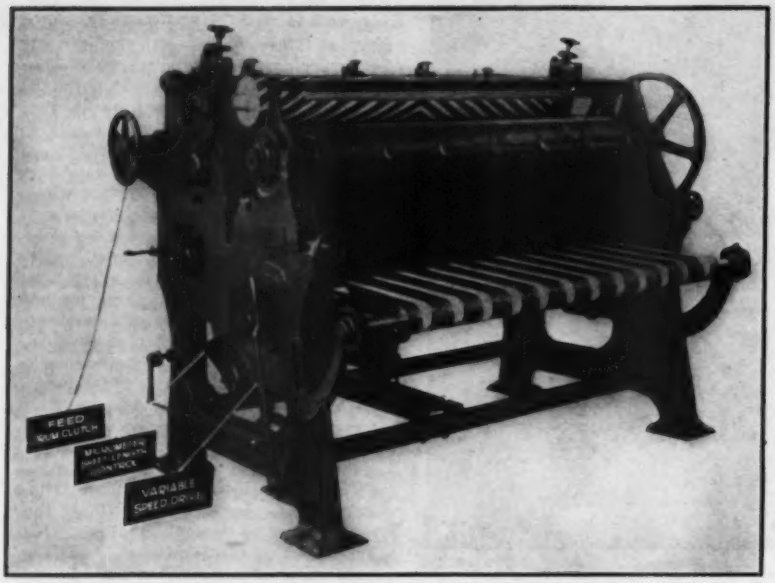


Fig. 27—Rotary paper cutter showing some improved features of design

through various stages to a vacuum, giving up heat in the process. Steam is supplied to the machine at the dry end and circulated through divided sections of the dryers until all the useful heat is absorbed in the last wet end dryers. This procedure creates and maintains a definite and positive drop in pressure between sections, which is claimed to insure a constant and unrestricted discharge of all condensate and air from every dryer. The flash steam in the condensate, prior to returning the condensate to the boiler room, is used in producing graduated wet end surface temperatures.

The second system is designed for operating at as low as 15 inches of vacuum in the wet end dryers, the main purpose of the system being to produce an evenly dried sheet with a uniform moisture content in preference to any radical increase in machine production.

Fig. 28—Improved design of slowness tester

In another of the older systems, a change has been made in the differential valve and sight flow steam regulator employed with the system. The differential pressure control valve, through the change, is now a self-contained differential valve which will operate from as low a pressure as 15 inches of vacuum to 50 lb. steam pressure. It is used to control differential in pressure between sections, a blowing through section and a condensing section. The sight flow regulator now employed permits better observation of dryer discharge, it being suggested that a man can stand at the dry end of a 30-dryer machine and see the discharge from every dryer.

Fig. 29—Sheet machine

Another drainage system, which up until recently utilized a dryer drainage pump of sufficient capacity to handle the returns from the entire paper machine dryer and reduced its temperature either through the introduction of cooling water at the pump or by means of an air or water cooler in the return line, now incorporates into the system a separate hot condensate pump that is driven from the main motor. With this arrangement, the hot condensate from the flash tank or tanks in a two or more pass system is not mixed with the cooler condensate from the condensing section. This permits the carrying of higher vacuum without the use of cooling water. Likewise, the main unit is proportioned to take care of the condensing section only, a hot condensate pump of the proper size being provided to take care of the condensate from the flash tanks. (Under certain conditions of pressure, it is suggested, cooling water may still be needed but in much less quantity than formerly to achieve the same results.) The hot water delivered from the condensate pump joins the cooler water from the vacuum unit in a common return line to the feedwater heater.

Fig. 30—Slowness tester designated as automatic

Slitting and winding equipment, likewise, has come in for some attention. This attention has brought about refinements in design that are contributing to decreasing maintenance cost and improving operation.

New Drives for Paper Machines

Several new types of paper machine drives also have been introduced to the trade within a comparatively short time.

There is an electric top press roll drive

Fig. 31—Porosity tester

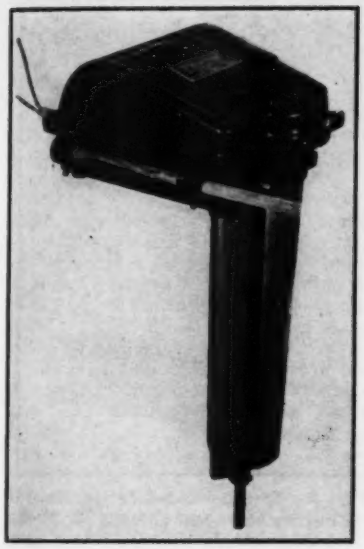


Fig. 32—White water sampler

(Figure 25) in which a special compound wound motor is either directly or chain driven to the top press roll and a generator chain driven from the pinion shaft of the quarter turn unit. This generator supplies the current for driving the motor. If the speed of the machine is changed, the speed of the generator will vary in direct proportion. Consequently, the voltage from the generator which is impressed on the motor varies in a similar manner, and the motor follows the speed of the machine.

A rheostat, used to increase or decrease the amount of power input to the roll, allows the operator to make easy adjustments. Excitation current for both the motor and generator is supplied by an exciter which is also furnished with the drive.

Several designs of individual motor drives for the wet end of cylinder machines (Figure 26) have been developed. Such drives are designed to relieve felt tension, and through so doing have resulted in increasing felt life, in allowing the use of a more open felt, and in allowing the use of a wider deckle.

Other paper machine developments that might be mentioned would include a system developed to introduce filler to the wet web on a paper machine wire; a variable pitch propeller type vat pump for cylinder machines; and a forming machine for wall board, insulating board, and other heavy sheets in which formation takes place in a straight line.

Finishing and Converting Equipment

There also has been some activity in improving finishing room and converting equipment.

One rotary cutter (Figure 27), for example, has been improved by substituting a positive and variable sheet length control mechanism for the usual expansion pulley, step pulleys and change gears; and by installing a variable speed clutch to permit operation within wide range of speeds, and a free wheeling feed drum control and clutch to permit hand feeding of paper when adjusting knife. Quieter operation also is obtained through the use of noiseless intermediate gears.

A roll separating device, electrically operated and controlled by push buttons, has been developed for use on supercalenders. This device enables the rolls to be separated at every opportunity, allows circulation of air around paper rolls to prevent burning, and aids in removing the rolls for repairs.

Another supercalender improvement consists of making the frames in sections with provision for removing the bottom roll, plus the coupling, endwise without disturbing the set of intermediate rolls and top roll. There has also been improvement in the design of intermediate roll journal boxes, side bearing strips, and oiling system for roll journals. More rolls with wider faces, likewise, are being used in glassine calendars—14 and 16 rolls in place of 12 and 13 and as wide as 73 inches face. The larger stacks are said to produce much greater finish and transparency with uniformity across the entire sheet.

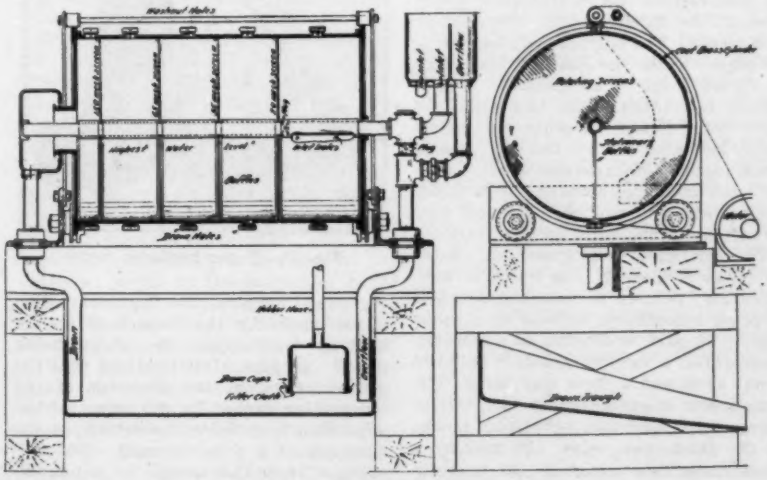


Fig. 33—Pulp classifier details

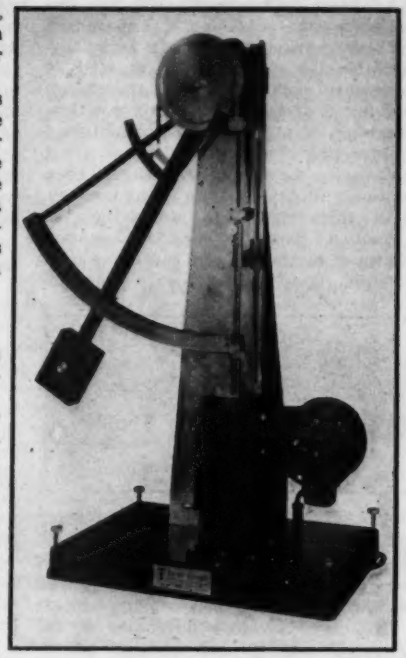


Fig. 34—Newly developed tensile tester

Speed with incident increase in production seems to have been the keynote behind some of the recent design changes in converting equipment. There has been an increase in speed on toilet folding, towel folding, and napkin folding machines so that productive capacity in the case of each individual type of machine has been increased considerably. A napkin folding machine that requires no belts in the delivery has been developed, and an embossing unit has been attached with at least one paper machine winder to emboss and rewind toilet tissue rolls, the embossing unit being capable of running at full winder speed.

New Control and Testing Instruments

Numerous citations might be made of improvements in design or in the development or introduction of instruments for control and testing purposes.

A slowness tester (Figure 28) has been re-designed and construction and operation simplified. The new design, supported on its own feet, is easily set up and leveled for work. Its drainage chamber, set with petcock downward and in closed position, is filled with stock sample to be tested. Screen is snapped on, and drainage chamber placed in position over divided funnel with petcock upward. Petcock is then opened and test continued until discharge from side outlet of divided funnel ceases. Reading consists of number of cubic centimeters of water collected from side outlet as measured in graduated cylinder. If multi-stage readings are desired, separate readings are taken at stated intervals of time during filling of graduated cylinder.

A sheet machine (Figure 29), redesigned some years ago, was placed on the open market in 1935. In using this machine, the recommended practice is to remove each sheet with the screen forming it and to dry in this position. Couching, if preferred, is accomplished by inverting screen with sheet on a wet felt, and the deposited sheet then pressed and dried in the usual manner.

An instrument for measuring the porosity of paper (Figure 31) has been improved by the use of a more powerful capston clamp in its base. This improvement prevents side leakage and permits use of proper amount of pressure upon the paper being tested.

Fig. 35—Formation tester

The more recently developed or introduced control and testing instruments would include a slowness tester designated as automatic, a white water sampler, a pulp classifier, a tensile tester, a formation tester, a multiple folding endurance tester, a combined smoothness and porosity tester, a paper hardness tester, and others.

The automatic slowness tester (Figure 30) is designed so that the making of a test simply requires a brisk vertical thrust of the instrument into the stock up to the handle. It is held in this position until a spindle at center of instrument ceases to rise—a matter of three to five seconds. The instrument is then withdrawn from stock and graduations read on spindle.

The white water sampler (Figure 32), furnished with motor for either 110 or 220 volts a-c., is arranged so that its immersion cylinder is submerged at a fixed level in the white water within a weir box. It is a compact, and water tight unit.

Fig. 36—Folding tester which will make up to ten folding tests simultaneously

The pulp classifier (Figure 33), through a system of stationary baffles and rotary screens, turns the fibers in a batch of pulp so that their length is broadside to a classification screen. The machine is operated at a predetermined speed and classification of the fibers is accomplished by flowing through four screen compartments—the screen mesh increasing in fineness in each compartment from the entering screen to the exit screen. This principle of induced circulation is said to result in a very fine classification of fiber lengths, best results being secured after a five-minute duration for a batch run.

The newly developed tensile strength tester (Figure 34), made to conform to T.A.P.P.I. requirements and methods, includes a graduated stationary sector that is provided with two scales. The scales are graduated to read in pounds or kilograms. The sector has a number of fine teeth on its upper surface into which the multiple pawl on the pendulum falls. An elongation device operates simultaneously with the tensile test. Power is hydraulically applied by means of a self-contained electrically driven oil pump. In normal operation, the tester is set for a speed of 12 inches per minute, but when necessary the speed may be varied from 1 inch to 24 inches per minute. The tester is made in various capacities up to 1000 pounds.

The formation tester (Figure 35) uses a photoelectric cell to measure the quality of paper known as formation. The sample to be measured is moved at high velocity between a steady light source and the photoelectric cell. The variations in opacity of the paper cause a fluctuation in the photoelectric cell current. These fluctuations are amplified by means of an a-c. amplifier, until they are of sufficient magnitude to operate a meter. The average steady photocell current is indicated on a second meter. The ratio of these two meter readings gives the formation number. Provision also is made for adjusting the steady current component to the same value for every sample to be tested, making the reading of the output meter alone the formation number.

The multiple folding endurance tester (Figure 36) has ten vertical spindles operated by a cross arm so that ten folding tests can be made simultaneously. The paper is alternately folded under compression and straightened under tension, the folding being reversed at each stroke. The compression load is ½ kilogram, while the tension load may be varied from ½ kilogram to 3 kilograms, depending upon the grade of paper being tested. A counter automatically indicates the number of folds, a break causing disengagement of a counter latch from the counter. The tester is electrically driven with a direct connected motor mounted on the frame.

The combined smoothness and porosity tester (Figure 37), as its name indicates, may be used for the measurement of paper smoothness as well as permeability. In part, it consists of a mercury manometer, a vacuum pump, a polished metal anvil and a three way valve. The manometer is connected to the vacuum pump, anvil and atmosphere by means of the three way valve. In making a smoothness determination, the paper to be tested is placed with the test side next to the polished surface of the anvil, after which a pad of soft gum rubber and a polished metal disc are placed over the sheet to act as an insulator and to prevent passage of air through the paper. Pressure is then applied to the metal disc through a lever arm; and vacuum applied until the mercury rises slightly above the 380 mm. mark. The valve is then adjusted so that it connects the vacuum reservoir and the anvil, and the time required for the mercury to drop 20 mm. is determined by means of a stop watch. A low stop watch reading indicates a rough paper, and a high reading indicates smooth paper. Slight changes in this procedure permit the instrument to be used for measurement of air permeability.

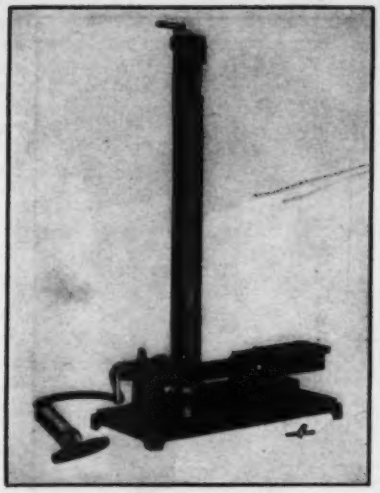


Fig. 37—Instrument for determining both smoothness and porosity

The paper hardness tester (Figure 38) is designed to permit the measurement of height of rebound of a swinging pendulum and the depth of indentation made by the impact of its indenting body upon the sheet being tested. In general, it is stated that the determination of the diameter of the indentation caused by the swing of the pendulum is sufficient to determine the hardness of a paper sample. The distance of fall and weight of pendulum are so selected that impact occurs at a

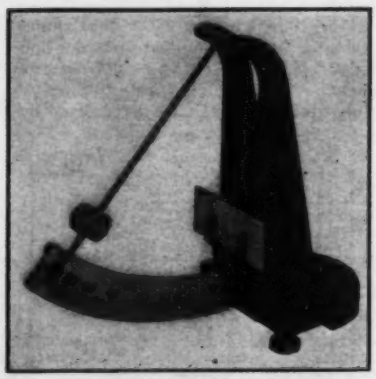


Fig. 38—Paper hardness tester

velocity of 1 meter per second and with the energy of a body of 100 grams.

Some Miscellaneous Equipment References

In addition to the specific developments and improvements which have been mentioned and others that might be mentioned are a number of other developments of perhaps a more miscellaneous character and yet of interest to pulp and paper making.

The general trend within the industry, for example, has been toward the handling of higher stock consistencies. This trend has necessitated a new line of pumps in which larger passages have been incorporated to permit use of moderately low liquid velocities and to allow for stock to be handled directly from stock chest without it being agitated thoroughly. Some of the advanced features of pump design include top horizontal discharge arranged to sweep gases in direction of flow to prevent gas binding, accessibility to all parts without disturbing permanent setting, deeper stuffing boxes, larger shafts, and other features to reduce cost of maintenance.

There also has been a development in centrifugal casting that permits pipe to be produced in alloys not obtainable in wrought form, and to make such pipe in sizes up to 22 inches O.D. This centrifugally cast pipe is suggested for use in hot acid installations and for blow pipes as well as for some other tubular product applications within the industry.

The uses for Monel metal have been studied and now it is being recommended for screening, dewatering, reclaiming, washing, beating, refining, sizing, coloring, paper machine, caustic recovery, and pumping applications.

A suction box conditioner has been introduced to the trade, and among the other miscellaneous developments that might be listed are improved or new designs of agitators, agitator drives, stock valves, steam traps, wood rolls, tanks, roll grinders, and equipment for materials handling.

May this resume, incomplete as it is, serve as recognition for those progressive manufacturers who are contributing to the progress and development of the pulp and papermaking industry.

Fox River Valley and Lake Shore Safety Conference

ONE of the largest safety meetings ever held in Wisconsin convened at Manitowoc, Wisconsin, Thursday, May 21. The meeting opened with a general session followed by a Luncheon Meeting. During the afternoon ten sectional meetings held special sessions which were all well attended.

Paper and Pulp Section

The Paper and Pulp Section held its session in the Elk's Club with about 150 representatives from paper mills in the Fox River Valley and from other Wisconsin points attending. The meeting was called at 1:30 p. m. with Chairman A. G. Briggs, Superintendent of the Personnel Department of Kimberly-Clark Corporation, presiding. Co-chairmen of the session were: R. C. Mahony, Appleton Coated Paper Co., and Bernard McClosky, Manager Industrial Relations Department, Hoberg Paper & Fibre Company, Green Bay.

"Specific Problems in Accident Prevention" was the subject of Mr. Griffen, safety engineer of the Employer's Liability Assurance Corporation, Ltd., who was the first speaker of the session. He spoke at length on the beginning of the safety movement in industry and recalled that previous to 1910 little had been done in a co-operative way in attacking the accident problem. During the early years, the guarding of machines was the all-important task and nothing in the way of safety education had been started. As industry progressed in the elimination of machine hazards, it became evident that a program of education was necessary to Mr. Griffen stated that surveys show about 88 per cent of industrial accidents are caused by employee negligence which can be overcome only by proper educational methods. The isolated machine was pointed out as the direct cause of many serious injuries and it was stated that special precaution should be centered on the guarding of all machinery in this classification. Visualizing hazards and correcting them before trouble arises was suggested by the speaker as part of a well planned safety program. It was brought out that the engineering department and the purchasing department should co-operate in the elimination of mechanical hazards by specifying that complete guarding be furnished on all new equipment purchased. It was stated that about 60 per cent of the injuries in the paper and pulp industry result from handling materials and hand tools, and that much could be done by safety directors in correcting handling methods and equipping workers with proper tools. Other important points that need to be considered, according to Mr. Griffen, are such things as: an employee's mental state caused by trouble and home worries; an analyzation of individual employees and the proper selection of new help; and a complete review of an accident to determine its cause.

"Management's Attitude Towards Safety" was the second subject on the program and was covered by E. M. Mahler, Vice President of the Kimberly-Clark Corporation, Neenah, Wis. He stated that management's attitude must be back of the plant safety program 100 per cent if it is to accomplish the maximum of efficiency and production from its employees. The speaker explained that he had been interested in safety for a great many years and that this now is one of his chief interests. Cases were cited of increased machine production in the plants by proper selection methods in the placement of help and the absence of accidents during this period. The speaker stated that he believes the most dangerous man is the indifferent employee who refuses to change his habits on the job. Another point stressed was that supervisors and department heads must know their company policies and co-operate to the fullest extent if they are to be successful. The day of the driving type of foreman is gone and the promotion of correct relations between supervisors and employees must be carried out. Mr. Mahler described the recent safety day program held at Kimberly, Wis., in which the entire town participated. He believed the awakening of community interest along these lines is sure to produce results. Mr. Mahler finished by stating his contention that efficient management must co-ordinate the safety movement and production in its plants for success, and that safety in industry, a movement instituted only a few years ago, has become a vital factor in all well managed concerns.

"Safety Movies." As a closing feature of the program, J. A. Limpert, Superintendent of the Pulp and Paper Department of the Kimberly mill of Kimberly-Clark Corporation demonstrated the value of motion pictures in safety work. Mr. Limpert exhibited movies taken at the Kimberly-Clark plant showing various paper and pulp mill hazards in actual operation on the job. Some of the hazards shown in the pictures have been solved by means of devices, guards, etc., but Mr. Limpert explained that some have remained unsolved not only in the Kimberly-Clark plants but in other mills as well. The unsolved hazards which were shown on the screen provoked discussion at the meeting. In all, about 50 such hazards were illustrated. The round table discussion which followed brought out numerous suggestions for the elimination of some of these paper mill hazards.

Banquet

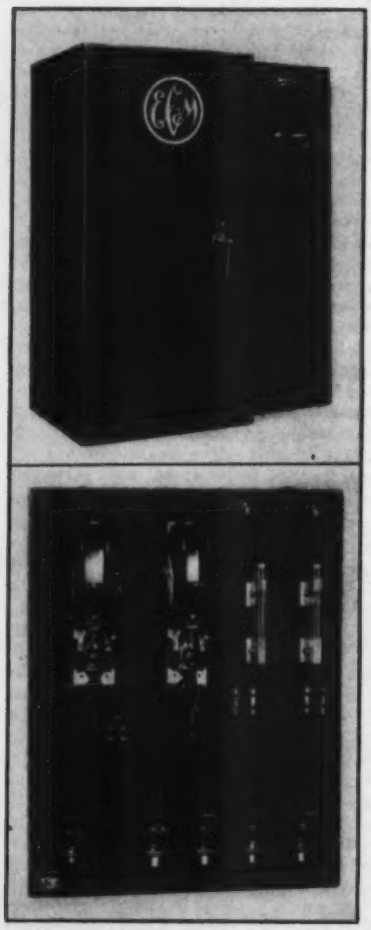
In the evening, all sections joined in a dinner meeting which was said to be the largest banquet ever served in Manitowoc. A number of addresses were given in the common cause of safety. The main speaker was Roger Sherman Hoar, prominent Milwaukee attorney, whose subject was "I Am My Brother's Keeper." The guests were entertained by a variety of music and entertainment.

◆ G. D. JENSSEN COMPANY has moved its offices from the Chrysler Building to 103 Park Avenue, New York City.

◆ Protective Panel for Cranes

The Electric Controller & Manufacturing Company, 2721 E. 79th Street, Cleveland, Ohio, has announced a complete line of new crane protective panels for use in protecting electrical equipment used on electrically operated cranes of the overhead traveling, locomotive and similar types.

These protective panels are used in place of circuit breakers, knife switches, fuses, etc., and incorporate all of the



necessary protective devices into a single, compact unit requiring a minimum amount of space.

They are complete with main line contactors, knife switch, receptacles for pilot lights to show the operator when power to the crane is alive, an instantaneous overload relay in one side of the line, and an inverse time element overload relay in the opposite side of the line for each motor and a separately mounted push button for closing the contactors or resetting them after they have been tripped by an overload.

They are built in three styles—open, completely enclosed, or front enclosed. In all three styles the main line knife switch is arranged for padlocking in the open position to prevent operation of the crane during idle periods or when repairs or adjustments to the crane are desired.

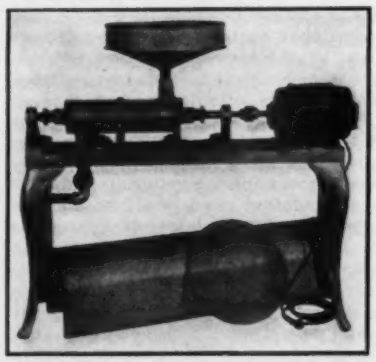
◆ Shrinkage Reduced in Self-Curing Rubber

The Self-Vulcanizing Rubber Company, Inc., 605 West Washington Blvd., Chicago, has announced a development and refinement in its plastic rubber which has reduced the shrinkage of its cold, self-curing process to about one-third the amount heretofore common in the application of rubber coatings and linings. The shrinkage of Selfvulc plastic, it is claimed, will not now exceed 8½ per cent. It is suggested that this decreased shrinkage means longer life for the rubber and the practical elimination of all strains between the rubber coating or lining and the surface to which it is applied. The rebuilding of conveyor belt surfaces which have been worn down by the abrasion of the materials carried is one application for which the plastic is said to be especially practical.

◆ Pigment Color and Clay Mixing Machine

The Crane color jordan, a machine designed to mix and disperse pigment colors and clays as well as to reduced viscosity and to equalize pigment particle sizes, has been announced by Colloid Equipment Company, 50 Church Street, New York, N. Y., as its exclusive distributors.

The machine consists of a shaft on which fifteen notched discs of unique shape are assembled at an angle of 18 deg. and which are rotated within a horizontal cylinder at 1750 r.p.m. through a directly-connected ½-hp. motor. This speed, combined with a clearance of .005 of an inch, causes great agitation of the material as it passes slowly through the cylinder, the material entering through a hopper located at the top and to one end of the cylinder. A four-mesh screen catches the debris contained within the material as it passes through the hopper into the cylinder. Discharge from cylinder may be at either



side or the front at the end opposite to the hopper to suit the convenience of the operation.

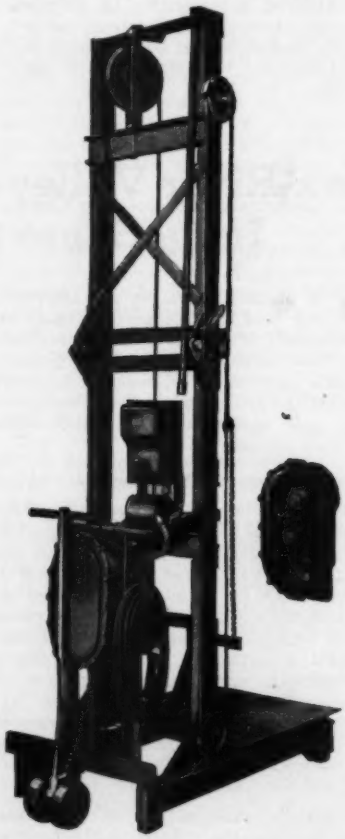
A metal stand supports the mechanism which together have a combined height from floor to top of funnel of 36 inches, a length of 40 inches, a width of 10 inches, and a weight of 125 pounds. The shaft, notched discs, and the cylinder are cadmium plated. Other metal work is galvanized.

The capacity of the unit, when wide open, is 250 gallons per hour. If a finer reduction of particle size is desired, the capacity is reduced by throttling the outlet. This unit was designed to fit the requirements of a 70-inch coating machine operating with a coating mixture running 50 per cent solids.

It is claimed that color costs are reduced through the use of this machine from 10 to 20 per cent, depending upon the grade of pigment, because of the better dispersion obtained which permits of the use of smaller amounts of pigment.

◆ Electric Portable Elevator

An electric elevator, that is made in capacities ranging from 500 to 5,000 pounds and for any piling height and size platform, has been developed by the Barrett-Cravens Company, 3255 West Thirtieth Street, Chicago. Incorporated



in the design of this elevator are a direct motor drive; cut spur gears (fully enclosed and running in oil); a ball bearing hoist and motor; an electric solenoid brake integral with motor; a three point suspension of hoist; a cable control; top and bottom limit stops; thermal overload switch; Hyatt equipped floor wheels, sheaves, and platform rollers; and a grooved cable drum. This elevator, used for both portable and permanent installations, is suggested as an aid in piling materials ceiling high and for floor-to-floor work.

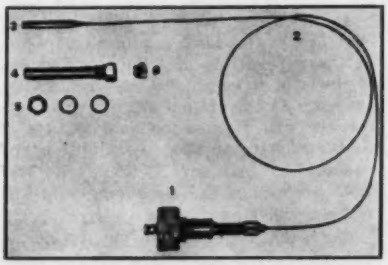
◆ Ceramic Pipe Joint of Rubber

A pipe joint that consists of a rubber ring or gasket having internal and external circumferential ribs and known as the Flexlock joint is now available for use with specially constructed ceramic pipe in pressure service up to 15 pounds per square inch and in temperatures not

exceeding 175 deg. Fahr. While the gasket permits easy insertion of the spigot, the shape of the corrugations combined with the resilience of the rubber forms a multiple seal which resists any tendency of the pipe sections to pull apart. The joint, stated to be watertight, rot-proof, corrosion-resistant, and flexible, is offered in two types for use with vitrified sewer pipe and chemical stone-ware pipe in a range of sizes up to 36 inches. It is a product of The B. F. Goodrich Company, Akron, Ohio.

◆ Automatic Steam Control Valve

An automatic steam control valve, designed for connection to the outlet or condensate end of heating coils in water heaters and in various types of industrial process equipment but which also may be used on the inlet end of coils, has been placed on the market by Yarnall-Waring Company, Philadelphia, Pa. The valve (1) is of the throttling type



and is operated by thermostatic element (2) of bulb and bellows design. Temperature adjusting sleeve covering bellows end of thermostat is screwed in for lower temperatures and out for higher. Choke screw on end of valve is adjusted to suit normal condensate flow, while plug on side permits check on operation. After initial adjustments for temperature and flow are made, the control is completely automatic in action, opening to discharge condensate when temperature of liquid falls a few degrees below point desired and closing when sufficient steam has been admitted to heating coil to re-establish operating temperature.

The thermostat bulb (3) may be clamped to outside of heater shell but is usually inserted in sleeve (4) which projects into water space in tank. The sleeve is screwed into ½ in. connection on tank wall or fastened in place by lock nut and lead washers (5). Bulb is locked into sleeve by split nut (6).

Valve body is made of cold rolled steel, disc and seat of stainless steel, stem of tobin bronze and bonnet of brass.

◆ Fan-Cooled Totally-Enclosed d-c. Motor

A new line of fan-cooled totally-enclosed direct current motors for general industrial service has been announced by Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. The motor sizes for this line, which is designated as Type SK, range from 5 to 75 hp. for 115, 230 and 550 volts direct current. These motors are built so that all solid foreign matter is excluded from their interior. There is also protection for

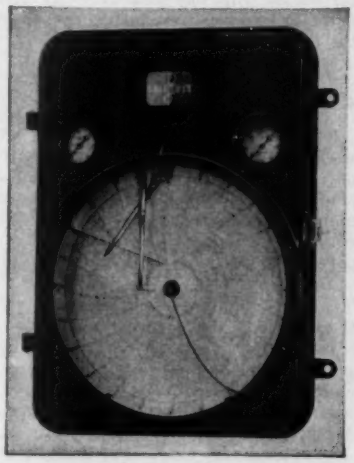
the interior against the entrance of splashing water such as occurs during the hosing of floors or walls. Likewise, with this design, only one cover need be removed to examine the brushes or commutator of an individual motor. In addition, the design permits mounting of pulley or pinion close to the supporting bearing.

◆ Recorder-Controller With Wide-Range Sensitivity Adjustment

The Bristol Company, Waterbury, Conn., announces a new series of pneumatic-type controllers known as Ampliset Free-Vane Controllers. These instruments are now available for automatically controlling temperature, time-temperature, flow, liquid level, pressure, time-pressure, and humidity. The Ampliset principle has also been combined with the Metameter, a system of telemetering recently announced by this company, for the remote control of steam pressure and gas pressure.

The sensitivity or throttling range of the instrument can be changed without removing the chart or chart dial. It can be changed without, in any way, disturbing the operation of the controller or upsetting the operation or equilibrium of the process.

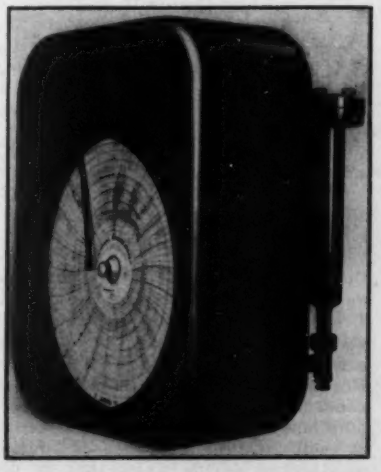
By the same adjustment that regulates the sensitivity of the Ampliset Con-



troller, the instrument can be changed from direct-acting to reverse-acting or vice versa. This change is made by simply turning the scale on the adjustment past the zero point.

◆ Orifice Meter

The Cochrane Corporation, Philadelphia, Pa., has developed and is introducing an orifice meter for the measurement of steam, water, air, and other miscellaneous liquids and gases. Flow through orifice, flow nozzle or venturi tube sets up a differential pressure which is conveyed by piping to a U-tube manometer and is measured in terms of rate of flow. A direct reading integrator, 12-inch diameter charts, spring wound or electric clock for driving charts and integrator, interchangeable manometer tubes to permit altering meter capacity,



safeguards in both high and low pressure chambers to prevent loss of mercury, removable cover plate to permit cleaning of chambers, large float with high buoyancy, throttling bushing to dampen violent fluctuations in flow, pres-

sure tight bearing of hardened stainless steel, forged steel float chamber, adaptation to flush panel or rear mounting, pressure and temperature records on same chart with flow, and ranges of meter bodies from one inch of water maximum to two hundred inches are among the features cited for this instrument.

◆ Portable Cable Accessories

The General Electric Company, Schenectady, N. Y., has announced a line of portable cable accessories which includes high-voltage cable couplers and molded terminals for all voltages. The couplers, which are rated at 100 amperes, are particularly adapted for use with G. E. 2500-, 3500-, and 5000-volt Types SH and G, portable cables; while the molded-rubber terminals are adapted to cases where it is desirable to terminate portable or drag cables at the source of energy or at the load by means of a terminal which will hold the single conductors firmly together as a unit.

Provision is made in the coupler socket so that the shielding tapes or ground conductors of the cable can be brought out for grounding purposes. Both the socket and plug are equipped with a cover to prevent the entrance of dirt and moisture when the cover is disconnected. The coupler socket and plug are made of a malleable iron frame with a malleable iron end bell that is bolted on. The end bells have been made interchangeable so that the plug-end bell may be put on the socket end in place of the socket-end bell and flexible connections made at each end of the coupler. The current-carrying contacts are of the sliding-spring type and are enclosed and shielded by Herkolite tubing. The molded-rubber terminal is made of G. E. R-387 tellurium compound and provides means of terminating ground wires and braided shields so that they can be correctly grounded.

◆ Austin Cary

Austin Cary, well known as a forester and a writer, passed away suddenly April 28 at the University of Florida, where he had gone to attend a conference.

Mr. Cary was the author of *Cary's Manual for Northern Woodsmen* and other articles on the subject of forestry. He had been associated with forestry since 1892. Some of his connections were: Conducting a personal study of the Androscoggin and Kennebec drainages for the State of Maine; work under Dr. Bernard E. Fernow in the old Division of Forestry of the United States; six years with Berlin Mills, now the Brown Company, Berlin, N. H., in which connection he mapped the company's land holdings and looked after a section of their logging; instructor of forestry at Harvard, during which time he did timber work for several pulp and paper mills. After serving as Superintendent of Forests for the State of New York during 1909-1910, Mr. Cary joined the U. S. Forest Service, from which he retired on July 31, 1935.

Just prior to his passing, Mr. Cary had announced that his services would be available as a forest consultant. Many of the readers of THE PAPER INDUSTRY will remember Mr. Cary's article "The Forest and the Paper Industry," which appeared in the April, 1936 issue. This was probably Mr. Cary's last published article.

◆ Two More Kraft Mills for South

News of activities in the South reaches a still greater interest in the late report of plans for two more kraft mills—these in addition to the announcement of a mill at Fernandina, Florida, by the Container Corporation of America, which is published elsewhere in this issue.

One of these plants will be built by the Mead Corporation for the Estate of the late Alfred DuPont and will be located at Port St. Joe, Florida. Work on this mill will begin promptly and plans call for one machine which will make from 250 to 300 tons of 16 pt. kraft liner board per day. The pulp will be produced in the plant in sufficient tonnage to meet the requirements.

Another plant is planned by West Virginia Pulp and Paper Company to be erected in the vicinity of Charleston, W. Va. This mill will be located on tidewater and will contain one Fourdrinier with a 240-inch wire to run on 16 pt. kraft liner board. The pulp will be produced in the plant. The construction of this mill will be under way within a few weeks and it is expected the work will be finished about the middle of the coming year.

◆ Brown Company Introduces Solka Yarn

A news item in *Tide Supplement* for May announces a new product just perfected by the Brown Company, Portland, Me. This latest development is Solka yarn, a synthetic wool yarn made from cellulose.

An illustration accompanying the item shows a knitted suit made of Solka yarn which the company has been exhibiting at its permanent exhibit in the Graybar Building in New York. This suit is machine-knit and is made to retail for $2.95.

◆ Papermarking Rolls

The Circuit Court of Appeals recently affirmed the decision of the District Court of the United States for the Western District of Wisconsin regarding a rubber-covered roll which is being used for marking and striping paper on papermaking machines.

The American Lakes Paper Company brought suit against the Nekoosa-Edwards Paper Company, a manufacturer of decorative wrapping paper, and The B. F. Goodrich Company, the maker of the marking roll, intervened and assumed the defense of the suit for its customer.

In this suit, it was held that The B. F. Goodrich Company's rubber-covered marking roll, made by the Vulcalock process, was not an infringement on the Seaborne Patent No. 1,517,018.

The use of the Vulcalock rubber-covered marking roll, especially in the striping or other decorative marking of wrapping paper, produces not only a much better stripe or mark on the sheet but also at a much lower cost than is possible to do with the striping felt.

The growing demand for striped and marked wrapping papers has provided a real field for an improved marking roll. Now that such a roll is available without risk of infringement, it is anticipated that the production of marked paper will be greatly stimulated throughout the industry.

The B. F. Goodrich Company's development and manufacture of the Vulcalock roll covering, which eliminates the hard rubber base and permits a direct bond of the cushion rubber to the metal core, has not only made possible the marking roll but a complete line of Vulcalock press rolls, couch rolls, felt carrying rolls, wire rolls and table rolls as well as miscellaneous roll coverings used in the paper and other industries.

This direct bonding of rubber to metal by the Vulcalock process has not only played an important part in the field of roll coverings but also has made possible the rubber lining of tanks, pipe, and rubber covering and lining of various metal parts for protecting the metal against corrosion, chemicals and abrasives.

◆ National Power Conference Plans Expansion Program

Plans have been consummated to broaden the scope of activities of the National Power Conference, formerly the Midwest Power Engineering Conference, the change in name having been effective since May 1.

Under the new plans, over 60 engineering bodies whose members are interested in power have been invited to become affiliated members of the conference. These societies extend from Maine to California and are the most prominent bodies in the United States. The members of these societies number well over 50,000 and form a group interested in the generation, distribution and use of power of large proportions and of vital energy. At the annual meetings the conference will discuss national aspects of power relating to use, co-ordination and economics. Already a theme for the 1937 conference has been suggested and is being developed.

The recent report on the electric utility industry gives some idea of the value of the industry, its gross income and its tremendous growth. The power engineer in both utility and industrial plants has an opportunity now for applying the latest knowledge in a most significant way.

Headquarters of the National Power Conference are at 308 W. Washington Street, Chicago, and activities are under the direction of G. E. Pfisterer, executive secretary.

◆ George M. Seaman

George M. Seaman, president of the Seaman Paper Company, Chicago, passed away at his home May 11. Mr. Seaman was 60 years of age and had been a paper merchant in Chicago for the past 40 years.

Mr. Seaman was born in St. Joseph, Mo. and came to Chicago when quite a young man. In 1895 he entered the paper business and in 1905 he and the late Thomas Bermingham founded their own paper company. Mr. Seaman was treasurer of the company until 1914 when he was made president. Since Mr. Bermingham's death, the company has been known as the Seaman Paper Company, with Mr. Seaman as its president.

Mr. Seaman was interested in many business enterprises and was recognized as being one of the leading men in the paper merchandising field in this country. He was president of the Henrotin hospital, one of the leading institutions of its kind in Chicago, and was credited with having been one of the founders of the Izaak Walton League.

Surviving Mr. Seaman are his widow and two daughters.

◆ H. J. Buncke Appointed Asst. Mill Manager at Rumford

The Oxford Paper Company has announced that Harry J. Buncke, formerly chief engineer of the company, has been appointed assistant mill manager of the company's mill at Rumford, Maine.

Mr. Buncke has been chief engineer of the company since June 1933. Previously, he was associated with the Abitibi Power and Paper Company, Toronto, Canada.

◆ George Raymond Made Superintendent of Central Fibre

George Raymond, who has been associated with the Central Fibre Products Company since 1918 when it was known as American Strawboard Company, recently was appointed superintendent of the plant.

Mr. Raymond has had long experience in the manufacture of board, prior to his present connection having been employed by Lafayette Box Board & Paper Company, St. Mary's Auglaize Paper Company and O. B. Andrews Paper Company.

◆ Morris Machine Works Elects New Officers

Morris Machine Works of Baldwinsville, New York, announces that changes in its executive personnel, incident to the death of Windsor Morris, have resulted in the election of Carl Lager as president, and Pierce J. McAuliffe, as vice president and general manager.

Carl Lager, the new president, joined the organization as its chief engineer forty-six years ago, and during this period he has been a leading factor in the remarkable advance in the development and application of centrifugal pumps.

Pierce J. McAuliffe joined the Company in 1910 as designer of hydraulic dredging equipment. During the War he was with the construction division of the Emergency Fleet Corporation, becoming manager of ship construction in 1918. He rejoined Morris Machine Works in 1920, and continued as their representative in the New York Office until taking up his new duties at Baldwinsville.

◆ Container Corp. Plans New Southern Mill

It was recently reported that the Container Corporation of America plans the sale of $10,000,000 new preferred stock, the funds to be used for the erection of a new kraft pulp and paper mill in Fernandina, Florida, and to retire the principal part of the company's funded debt.

The estimated cost of the new plant is $5,500,000, exclusive of engineering services, financing, timber lands and working capital. According to present expectations, the new plant will be completed late in 1937.

◆ Sorg Takes Over Two Bag Companies

The Sorg Paper Company, Middletown, Ohio, recently announced the acquisition of the Superior Bag and Paper Company and the Lawrence Bag Company, both of Middletown.

The two companies now merged with Sorg company will be known as the Superior-Lawrence Division and will be operated as at present for a while. Eventually, the two concerns will be housed in the Lawrence Bag Company. The new division will produce grocery bags, glassene bags and shopping bags.

◆ Northwest Paper Elects Directors and Officers

At the annual meeting of The Northwest Paper Company, held in Cloquet, Minnesota, on May 13, the following board of directors was elected: R. M. Weyerhaeuser, H. C. Hornby, F. K. Weyerhaeuser, George R. Little, E. W. Davis, John M. Musser and W. B. Driscoll.

F. K. Weyerhaeuser was elected chairman of the board; H. H. Irvine, president; W. H. Kenety, vice president; S. L. Coy, vice president; Hugo Schlenk, secretary and treasurer.

R. M. Weyerhaeuser and H. C. Hornby, after many years as chairman of the board and president, respectively, asked to be relieved of active duty. .

◆ Du Pont Announces a New Resin

A new hydrocarbon resin, called RH-35, has been developed by The R. & H. Chemicals Department, E. I. du Pont de Nemours & Company, Wilmington. The new resin is brittle, odorless, crystal-clear, and water-white; it has excellent electrical properties, high refractive index, and is highly resistant to heat and light.

RH-35 is readily soluble in most of the hydrocarbon solvents as well as in a variety of other organic solvents. Owing to a broad range of compatibility, RH-35 may be blended to give transparent mixtures, some of which have properties quite different from the constituent materials. When blended with other resins, increased resistance to water, acids, and alkalis is imparted, and the flow in hot melts is improved. At present RH-35 shows promise in the textile, paper, printing ink, coating, and adhesives industries.

◆ Murray Co. Busy With Equipment Orders

That there is real activity among paper mills this summer preparing their equipment for the future is shown by the announcement made by D. J. Murray Mfg. Co., Wausau, Wisconsin, manufacturers of pulp and paper mill machinery. The following mills have contracted for new equipment which will be made this summer:

The Champion Paper & Fibre Co. for their new mill at Pascadena (Houston), Texas, three Murray-Waern waste heat recovery systems. On this job all pressure parts were furnished by Combustion Engineering Co., New York, who are associated with D. J. Murray Mfg. Co. on this system; three 12 x 50 ft. Murray-Branch patented barking drums; three 96 in. Murray chippers, heavy duty, direct connected, synchronous motors, roller bearing.

Crossett Lumber Co., Crossett, Arkansas, one 12 x 45 ft. Murray-Branch patented barking drum; one 96 in. Murray chipper, heavy duty, direct connected, synchronous motors, roller bearing; one Murray special chip crusher; one 12 plate Murray Flat screen with the Dunbar patented drive.

Detroit Sulphite Paper Co., Detroit, Michigan, one 12 x 45 ft. Murray-Branch barking drum.

◆ Another Bantam Plant Addition Under Way

The Bantam Ball Bearing Company is adding new machinery and building an addition to its plant at South Bend at a cost of $250,000. This new expansion gives an additional area slightly greater than the addition which was built last year which gave the factory a 60 per cent increase in floor space.

The finest equipment available in the industry for machining and grinding is being purchased as a means of securing greater production and assuring maximum control of quality.

◆ AT A MEETING of the directors of The Dayton Rubber Manufacturing Company, April 30th, John A. MacMillan was elected Chairman of the company and the Board of Directors, and as such, remains the chief executive officer of the corporation. A. L. Freedlander, who has served for the past 16 years as vice president of the company, and head of the Research and Production Departments, was elected president, and as such, heads up all operating departments of the business, including distribution.

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For complete information, call local Morse office, or write factory.

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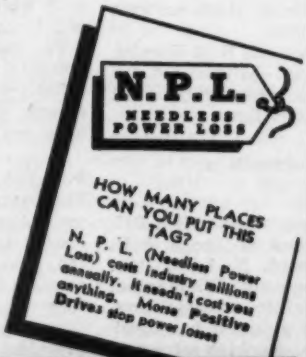
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333 N. Michigan Ave., Chicago, Ill.

◆ Change in Bantam Officials

The Bantam Ball Bearing Company announces the retirement of Karl Herrmann as vice president and general manager. He is being succeeded by A. H. Frauenthal, formerly assistant general manager.

Mr. Frauenthal came to the Bantam organization in 1930. Previous to that time he had been with Studebaker as quality engineer and before that with Chandler, where he occupied the position of chief inspector and metallurgical engineer.

Since that time he has spent several years in the field as sales engineer in various parts of the country previous to coming into the home office. After several years as a divisional manager in charge of sales, engineering and manufacturing, he was appointed as assistant general manager of the company.

Although Mr. Herrmann is retiring from his major duties as general manager in line with plans made when The Bantam Ball Bearing Company was consolidated with The Torrington Company, his services are being retained as consulting engineer. Coming to Bantam in 1929 as vice president and general manager, the company, under his direction, has increased its business to where it is now running ten times the average of the previous five years.

After a vacation, Mr. Herrmann plans to re-enter some phase of the automotive field.

◆ WM. E. VAN HORNE, for 25 years purchasing agent of Champion Paper & Fibre Company, passed away at Hamilton, Ohio, April 21 after an extended illness. He was 53 years of age.

◆ New Catalogues and Publications

Bausch & Lomb Optical Co., Rochester, N. Y.—Industrial chemists will be interested in a new bulletin recently issued; Catalogue D-20, entitled "Instruments for Spectrographic Analysis." The theory and principle of these instruments are set forth in an academic presentation, and the use of the spectrograph in the industrial field is clearly indicated. There are 32 pages and cover and the catalogue is well laid out with separate chapters and topic sub-heads. There are a number of illustrations, charts and other data. An interesting and uniqne feature of the catalogue is a section devoted to bibliography of spectrographic analysis.

Dominion Engineering Co., P. O. Box 3150, Montreal, Que.—This company has just issued a booklet devoted to its Michell Pivoted Bearings. Full information is given concerning the general principle of the bearing, types and dimensions, etc.

Fairbanks, Morse & Co., Chicago—F-M Propeller Pumps, for the efficient handling of large quantities of water at low heads, is the subject of a new bulletin, No. 6310. These pumps are described and their application illustrated by views of representative installations.

Hancock Valve Div., Bridgeport, Conn.—A new bulletin features the Hancock Forged Steel Valves, for which a number of distinctive features are claimed by the makers. The bulletin is largely a colored pictorial presentation, the description being particularly conveyed through explanatory cross sectional diagrams and other illustrations. There are tables of dimensions, specifications and prices and weights.

Ingersoll-Rand Co., Phillipsburg, N. J.—This company's Type-30 line of industrial compressors and vacuum pumps, is covered in a new catalogue of 28 pages and cover. Units mounted on horizontal and vertical tanks are shown; also units unmounted, and mounted on carriages. Copies on request.

Lawrence Pump and Engine Co., Lawrence, Mass.—Vortex single-stage pumps, manufactured by this company, are covered in a recent bulletin. There are performance tables, dimensions, parts, etc., with a diagram showing all parts used in construction. Copies available on reqest.

Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Pa.—A new control system for regulating input in proportion to demand is described in a catalogue entitled Micromax Electric Control. This catalogue covers the salient features of design, and explains the range of control applications. There are also illustrations of the complete control mechanism.

Lewellen Manufacturing Co., Columbus, Ind.—Catalogue 25-D illustrates and describes in detail the latest development in variable speed transmissions and speed controlling devices manufactured by this company. There are 48 pages and cover and the information is catalogued and indexed in an efficient manner. The book is profusely illustrated and contains many tables of data and interpretive diagrams.

Lincoln Electric Co., Cleveland, Ohio—A new folder, entitled "Facts for Users of A. C. Motors," lists five points that should be checked when buying motors. Tables of data and price lists are shown.

Linde Air Products Co., 205 E. 42nd St., New York, N. Y.—A new booklet presents the latest information on Welding and Cutting High Chromium Steels. This material which is available in booklet form was prepared for and read before the 36th annual convention of the International Acetylene Ass'n, Cleveland, in November, 1935, by W. J. Priestley, vice president, Electro Metallurgical Co. Copies on request.

Link-Belt Company, 307 N. Michigan Ave., Chicago—A new 208-page catalogue, No. 1500, devoted exclusively to power transmission equipment has just been published by this company. It features the recently announced line of Link-Belt antifriction roller bearing units, as well as an entirely new group of streamlined babbitted bearings, several new types of takeups, and many other new products. There are many illustrations, tables of dimensions, weights and list prices, and a cross reference index for convenience. Three new booklets on automatic firing with bituminous coal, for boilers up to 300 hp. have just been released. No. 1541 covers the series of automatic coal burners for the home; No. 1537 applications of L-B stoker firing to commercial heating plants, and No. 1538 covers automatic generation of process steam, high or low feature. The anthracite series is illustrated in No. 1522.

Morris Machine Works, Baldwinsville, N. Y.—The special features of the Morris High-speed Non-clogging Centrifugal Pump which is recommended for handling thick paper stock and other pulpy materials are outlined in a new folder just released. There are cross-sectional diagrams, rating and dimension tables, as well as halftone views. Ask for bulletin No. 160.

Norton Company, Worcester, Mass.—Anyone interested in the subject of grinding will find valuable information in a booklet entitled "Grinding and Finishing with Portable Equipment," just published by this company.

Philadelphia Gear Works, Philadelphia Pa.—Two new sizes in this company's MotoReduceR line, Nos. 405 and 444, have been added to the standard series and are listed in Bulletin MR36, which is available on request. This bulletin is replete with many tables of data, diagrams and illustrations. There are 28 pages and cover and the bulletin is punched for binding.

Reeves Pulley Co., Columbus, Ind.—A broadside illustrates the wide selection of this company's variable speed control equipment and lists some typical examples for a large number of Reeves applications.

Reliance Elec. & Engr. Co., Ivanhoe Road, Cleveland, Ohio—Two new folders list the principles of design which are built into this company's 6-pole, Type T heavy-duty motors. No. 215 covers Frames 1050-T, 1400-T and 1970-T. No. 216 is devoted to Frames 2000-T 2500-T. These motors are for direct current 40 deg. C. rating.

The Terry Steam Turbine Co., Hartford, Conn.—A new bulletin, S107, is devoted to this company's line of single-stage axial flow impulse turbines. The design and construction of the different types are concisely discussed and there are photographs and diagrams.

Union Steam Pump Co., Battle Creek, Mich.—Union Centrifugal Stock Pumps are featured in Bulletin No. 95, which supersedes bulletin No. 88. Full specifications are outlined and there are installation photos. Also illustrated are other paper mill pumps in various types of uses.

John Waldron Corp., New Brunswick, N. J.—A new two-color catalogue which is now ready for distribution, covers the range of this company's new addition to its coupling line; namely, the Waldron Gear Type Flexible Coupling. The booklet contains diagrams, ratings and complete description of the various types. Copies to interested executives.

Worthington Pump and Machinery Corp., Harrison, N. J.—The following new bulletions have been received: W-210-B20 which is a test in questionnaire form to find whether or not you are losing money on your feedwater heating; W-317-B5 covers the Freflo centrifugal pumps for underpass drainage; and W-318-B7 is devoted to Balanced Multi-stage volute centrifugal pumps for boiler feed service.

BOOKS

Chemical Formulary, Vol. III.—This book, a companion volume to Volumes I and II, contains thousands of formulae, none of which are included in the two previous volumes. These formulae are grouped conveniently into nineteen alphabetically-arranged chapters. Among the chapters which might be of interest to pulp and paper mill chemists, technologists, research workers, and operators are such chapters as adhesives; coatings, protective and decorative; emulsions; lubricants, oils, fats; materials of construction; *paper;* rubber, resins, waxes, plastics; soaps, cleaners; and a chapter of miscellaneous formulae. In addition, there is an index to the volume as well as a combined index for the three volumes. This arrangement makes it possible to locate any formulae in any of the three volumes through reference to the combined index. Volume III is of the same general style and size as the preceding volumes and contains nearly 600 pages. H. Bennett, editor-in-chief of each of the three volumes, in the case of Volume III was aided by a board of editors totaling more than forty members. The book is priced at $6.00 per copy net and may be obtained through D. Van Nostrand Company, Inc., 250 Fourth Avenue, New York, N. Y.

Know Your Man—The author of this booklet, Lieutenant Commander Frank V. Martinek, U. S. N. R., and, in business life, Assistant Vice President in Charge of Personnel and Statistical Department, Standard Oil Company of Indiana, touches upon the trying problem of unemployment and reveals the need for courtesy, cheerfulness, humility, kindness and patience on the part of employer and personnel counselor alike in the hiring and employing of men. It is an inspirational message for both employer and employee with a very timely appeal. The booklet, priced at $1.00 per copy, has been published by The Christopher Publishing House, 1140 Columbus, Ave., Boston, Mass.

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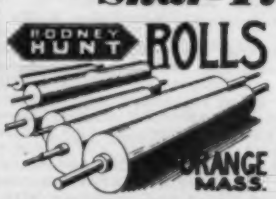

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◆ Import Committee's News of the Month

The monthly report of the Import Committee of the American Paper Industry tells of favorable action at various ports on importations of many kinds of paper. Sulphite Wrapping at Philadelphia was found to be undervalued, and mandarin paper, of the kind used by Firestone tires for its advertising literature, though claimed to be standard newsprint duty free, was classified for duty at Los Angeles and Atlanta.

Two importations at Boston of Norwegian paper entered as vegetable parchment at a duty rate of 2 cents per pound and 10 per cent are believed to have been grease-proof or imitation parchment, owing to the value of 7 cents per pound on one shipment and 6 cents on another. Best information available in this country is that there is no vegetable parchment mill in Norway. Glassine from Norway was recently imported at Philadelphia as parchment, but the Custom officials reclassified the shipment at the proper rate of duty.

Finnish pulpboard is being sold in the United States at about $50 per ton delivered duty paid, and a question whether the shipments are undervalued has been decided favorably to the importers. Such board is being sold in Finland at $30 per ton, and the United States price of $50 involves a profit of about $9 per ton. The small amount sold in the Finnish home market, while sufficient to fix a dutiable value for United States Customs computations, might readily be sold at a loss compensated for by the saving accomplished in United States duties on the large quantity imported. An unusual phase of the situation is that the same home market value has been established for laminated board as for the solid board, and by the same method. Imports of the solid board in February totaled 500 tons, an increase of 350 tons over the shipments for the same period in 1935.

The United States Court of Customs and Patent Appeals has decided that an advance in dutiable value of groundwood printing paper imported from Canada was void because the Buffalo Collector of Customs did not examine the proper proportion of 224 rolls of paper, but only examined seven rolls of the shipment. Under the law, ten per cent of all packages of imported merchandise must be examined, unless exempted by special regulation of the Secretary of the Treasury. The Secretary authorized the examination of a lesser number, but the importers claimed the authorization being in letter form was not a "special" regulation, and that therefore the appraisement was void. By thus claiming an illegal appraisement in a case in which the alleged illegality was in the interest of the importer, the advance in value of 25 cents per hundred pounds was nullified.

Cases continue to accumulate in the United States Customs Court in which importers of paper claim a 20 per cent reduction from the normal duty rate because of the concession of this percentage granted Cuban produce. Cases in which this claim was made in court in April include the following:

German wrapping paper, supercalendered both sides (imported at Boston)
German tracing paper
Japanese wallpaper
German metal decorated paper (four shipments)
German drawing paper
German carbonizing tissue
Finnish pulpboard
Japanese tissue paper
English rotogravure photographic tissue
German papeterie
German miscellaneous paper (five shipments)

The long battle over the classification of bristol appears to have been closed, and the several hundred cases involving such importations are being dropped as they reach the United States Customs Courts. Fourteen such cases were dropped in Philadelphia in April. The importers have finally lost their claim that the duty rate is that provided for cardboard, of 10 per cent. What the effect will be of the reduction in duty granted under the reciprocal trade agreement with The Netherlands remains to be seen, as it has not yet been in effect long enough to change the trend of imports. A report to the Import Committee from Amsterdam shows

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The Tulpehocken Plant at BLAIR AVENUE & TULPEHOCKEN RIVER, READING, PA., THURSDAY, JUNE 18, 1936, at 11 A. M. (D.S.T.).

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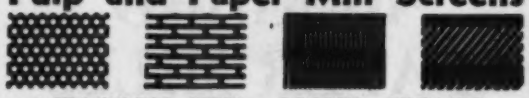
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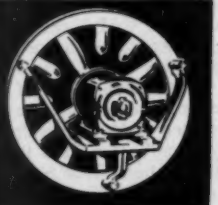
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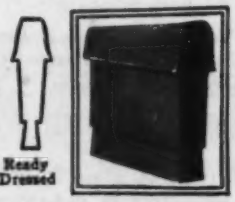
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that since the Import Committee carried through the cases in Customs courts to prevent the admission of such bristol at the 10 per cent cardboard rate, exports from Holland have fallen off sharply. The United States was formerly the chief market for the Netherlands bristol, exports totaling about 4,500 tons per year. That figure has now dropped to less than 200 tons.

◆ Foreign Cigarette Papers Monopolize the American Market

"The reciprocal trade agreement with France, reducing the rate of duty on cigarette paper from 60 per cent to 45 per cent, makes an outright gift of $600,000 from the revenues of the United States Treasury to the American cigarette manufacturers. Ten thousand tons of cigarette paper are used in this country, 2,500 tons of which are produced by domestic paper mills. These and other domestic paper mills are now capable of producing at least 5,000 tons more of cigarette paper but with any increase of importations from abroad, they will not expand as they had planned to, which means less employment than had been contemplated. The exports of American cigarette paper are and will be negligible.

"Shortly after the outbreak of the World War, the imports of cigarette paper into the United States were decidedly curtailed, so that the American cigarette manufacturers were not able to get their full requirements or the qualities which they desired. In case of another European conflict, this story would repeat itself, although if the American paper manufacturers were given encouragement by purchases from American cigarette manufacturers, they would be able to supply now, and in the future, the same qualities of paper, and in many instances better than those now made in Europe."

This was a statement made by Emmett H. Naylor, Executive Secretary of the Writing Paper Manufacturers Association, at a meeting of the Thin Paper Group of that association held at the Waldorf-Astoria last month. This group includes the American producers of cigarette paper. Mr. Naylor further stated:

"The Trade Agreement will not benefit France, as it already has the greater portion of the American cigarette paper business today. The cigarette manufacturers cannot pass on the benefit to the smokers, as a $1.50 spool of cigarette paper will make 45,000 cigarettes.

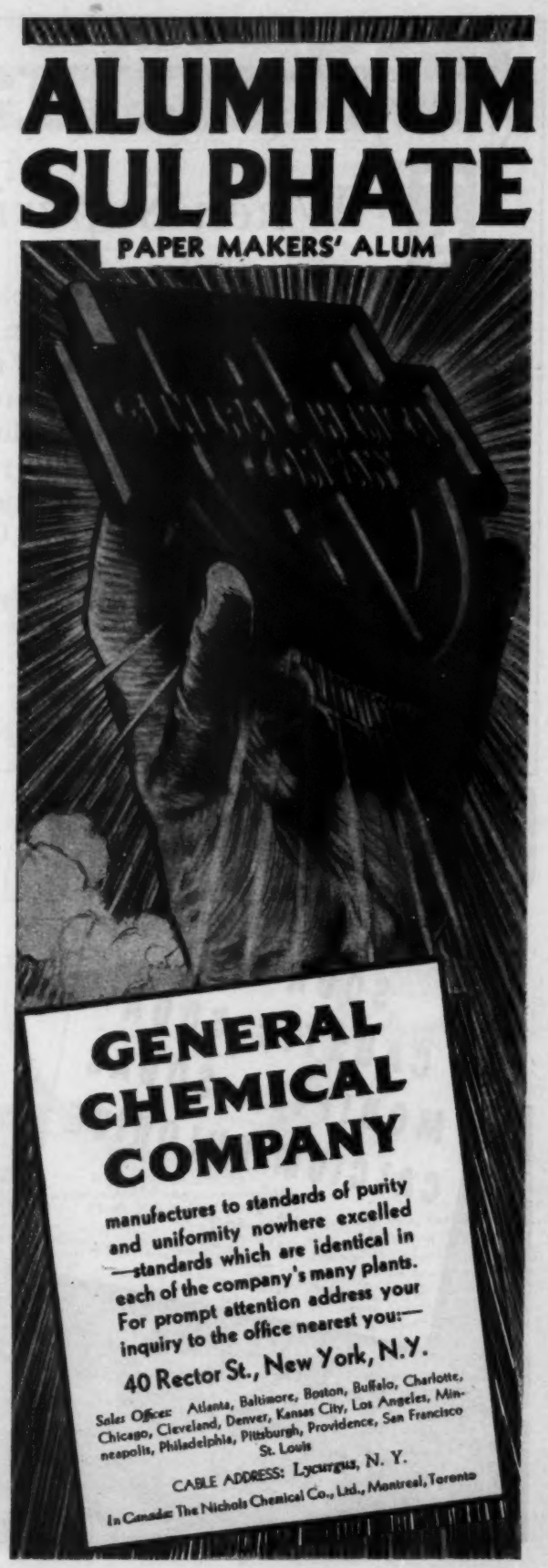
"The imports of cigarette paper in 1936, estimated on the basis of the actual imports for the first three months, will total $4,000,000. By a reduction of 15 per cent in duty this amount will as indicated cut the United States revenues $600,000.

"A further point of interest is the manner in which the United States Government thus reimburses the cigarette paper importers for evasions of the existing tariff law. Since the first of this year, the United States Customs Court have held that over 200 separate importations of French cigarette paper were under-valued, and the importers were forced to pay additional duties for such law evasion.

"The announcement of the Government that the American price is lower than the delivered cost of French paper is undoubtedly true at present, but it only serves to demonstrate the grip that the foreign cigarette paper monopoly has on the American market. If France devalues the franc, as now appears probable, even this advantage will disappear."

Imports of cigarette paper for the last six years, with the loss in duty which would have resulted had the new rate been in effect, are as follows:

Year	Value of Imports (Including Cigarette Books)	Amount of 15% Duty Reduction
1930	$4,290,682	$643,602
1931	5,396,469	809,470
1932	4,141,144	621,171
1933	3,426,325	513,948
1934	4,122,578	618,396
1935	4,000,272	600,040
1936 (three months)	1,027,686	
1936 (year estimated)	4,110,744	616,610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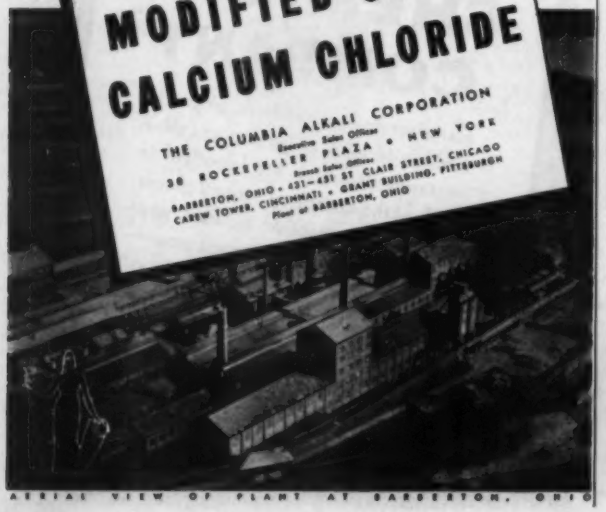

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July 1, 1935 to June 30, 1936

Cumulative Scores as of April 30

18 Perfect Scores

PERFECT SCORES
Division I—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
GROUP A			
GROUP B	Hollingsworth & Whitney Co.	Algonquin & Taconnet	Waterville, Me.
GROUP C	Continental Paper & Bag Corp.	York Haven	Pennsylvania
	International Paper Co.	Little Island	No. Tonawanda, N.Y.
	Finch, Pruyn & Co., Inc.	Glens Falls	New York
GROUP D	Harriman Company	Harriman	Tennessee
	International Paper Co.	Webster	Orono, Maine
	Hollingsworth & Whitney Co.	Aroostook & Cobbossee	Gardiner, Me.
	Bird & Son, Inc.	Phillipsdale	Rhode Island
	U. S. Gypsum Co.	No. Kansas City	Missouri
	Central Fibre Prods. Co.	Vincennes	Indiana
	Spaulding Fibre Co., Inc.	Milton	New Hampshire
	Hollingsworth & Whitney Co.	Abenaquis	Madison, Me.
	Mead Paperboard Co.	Rockport	Indiana
	Division II—Remanufacturing		
	Union Bag & Paper Corp.	Specialty	Hudson Falls, N.Y.
	Kimberly-Clark Corp.	Atlas	Appleton, Wis.
	Texas Corrugated Box Co.	Dallas	Texas
	U. S. Gypsum Co.	Genoa	Ohio
	Bemis Bros. Bag Co.	East Pepperell	Massachusetts

IMPERFECT SCORES

	Key Number	Rank	Disabling Injuries	Frequency Rate
GROUP A	P- 55	2	3	1.128
	P- 30	3	8	5.013
	P- 44	4	8	5.892
	P- 27	5	15	5.992
	P-101	6	9	7.672
	P- 19	7	10	7.776
	P- 10	8	10	7.941
	P- 13	9	13	8.679
	P- 18	10	15	9.218
	P- 62	11	17	9.961
	P- 1	12	21	10.163
	P- 67	13	21	10.420
	P- 12	14	14	11.662
	P- 60	15	18	12.177
	P- 2	16	14	12.181
	P- 64	17	14	12.741
	P- 78	18	18	13.853
	P-102	19	24	14.689
	P- 23	20	18	15.199
	P- 95	21	23	20.227
	P- 73	22	36	21.290
	P-114	23	33	24.432
	P- 40	24	29	27.742
	P- 87	25	41	30.154
	P- 74	26	61	36.230
	P- 71	27	69	60.245
GROUP B	P- 70	1	1	1.029
	P- 15	2	1	1.303
	P- 11	3	2	2.613
	P- 22	4	4	4.738
	P- 68	5	4	4.878
	P- 51	6	4	5.877
	P- 31	7	7	7.439
	P- 26	8	7	7.452
	P-112	9	6	8.017
	P- 21	10	9	10.322
	P- 25	11	12	12.134
	P- 54	12	9	12.902
	P- 3	13	9	13.239
	P- 66	14	11	14.458
	P- 16	15	11	15.049
	P- 82	16	14	17.074
	P- 45	17	22	28.902
	P-104	18	22	34.742
	P- 76	19	24	36.364
	P- 32	20	35	44.775
	P- 77	21	39	55.170
GROUP C	P- 97	4	1	3.039
	P- 52	5	2	4.458
	P- 46	6	3	5.579
	P- 61	7	3	7.289
	P- 43	8	3	8.121
	P- 72	9	5	8.353
	P- 59	10	6	10.239
	P- 17	11	5	12.623
	P- 47	12	5	13.052
	P- 37	13	9	18.637
	P- 88	14	9	19.082
	P- 75	15	10	20.437
	P- 41	16	9	21.137
	P-103	17	7	21.160
	P- 49	18	7	21.225
	P- 29	19	10	21.370
	P- 48	20	10	22.518
	P- 34	21	9	24.364
	P- 89	22	11	24.506
	P-111	23	11	25.625
	P- 4	24	15	36.117
	P- 14	25	15	46.172
	P- 33	26	20	46.385
	P-113	27	29	58.521
	P- 50	28	22	70.178
GROUP D	P- 7	10	1	3.927
	P- 92	11	1	12.118
	P-115	12	1	12.922
	P-117	13	3	13.192
	P- 96	14	1	14.779
	P- 53	15	3	16.856
	P- 81	16	4	18.172
	P- 6	17	5	18.260
	P-119	18	4	19.972
	P- 65	19	2	20.513
	P-116	20	6	22.054
	P- 8	21	3	23.002
	P- 42	22	4	24.193
	P- 90	23	4	24.615
	P- 36	24	5	26.897
	P- 94	25	7	30.029
	P- 85	26	2	30.664
	P- 98	27	8	32.555
	P- 99	28	5	36.714
	P- 80	29	11	43.157
	P- 24	30	8	46.205
	P-106	31	12	47.888

No April Report: Int. Paper Co., No. Tonawanda, N.Y., P-80, P-81.

No March or April Report: P-32, P-64, P-65, P-66, P-92

Division II

R- 5	6	5	5.629
R- 11	7	1	6.291
R- 20	8	8	9.319
R- 3	9	2	9.605
R- 9	10	2	9.806
R- 6	11	10	9.869
R- 2	12	7	10.504
R- 18	13	3	10.989
R- 21	14	9	12.509
R- 1	15	5	14.963
R- 10	16	10	21.427
R- 14	17	4	38.625

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Whenever you need any steel or allied products for new work . . . maintenance . . . or repair, write, wire or phone Ryerson. All materials are in stock for immediate shipment.

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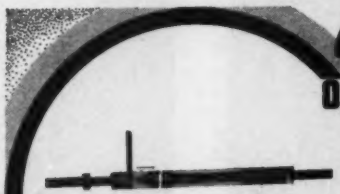

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Flat Pulp Screens, Winder Shafts, Cylinder Moulds, Deckers, Roll Heading Machines; Paper Machine Drives, Refiners-Hydrators, Gate Hoists, Grid Unit Heaters

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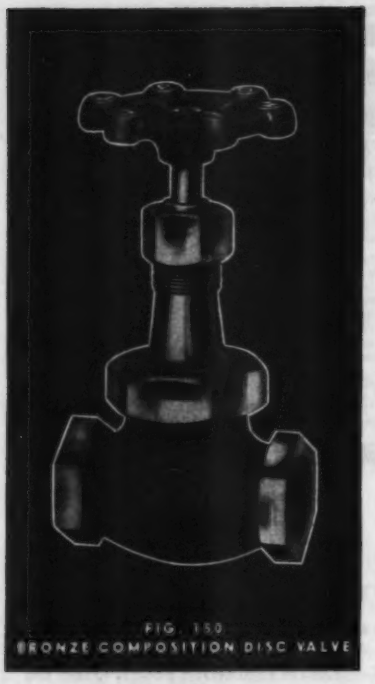


FIG. 150
BRONZE COMPOSITION DISC VALVE

Powell Bronze, Iron And Steel Valves For Every Service

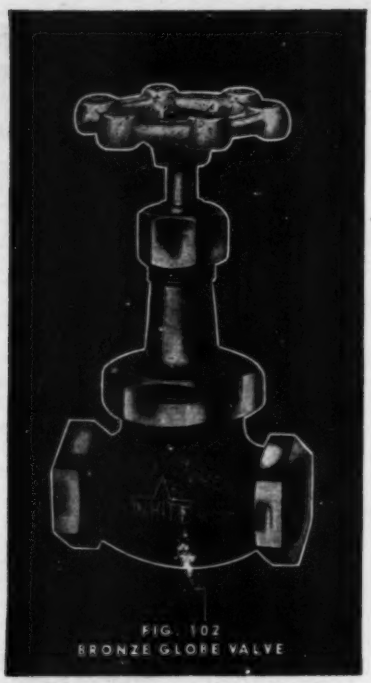
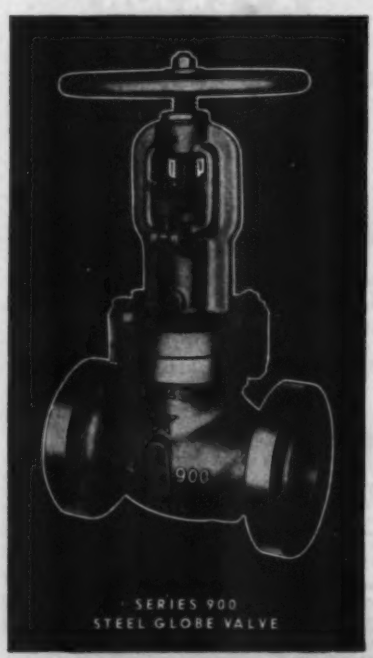


FIG. 102
BRONZE GLOBE VALVE

Powell Valves — redesigned and modernized for present day trends, mounting pressures and temperatures — are available in alloy bronzes, high test cast iron, carbon or alloy steels, and other improved materials... A complete line of Powell gate, globe, angle, check, safety, and Y valves for various pressures and temperatures offers a solution for your valve needs.



SERIES 900
STEEL GLOBE VALVE

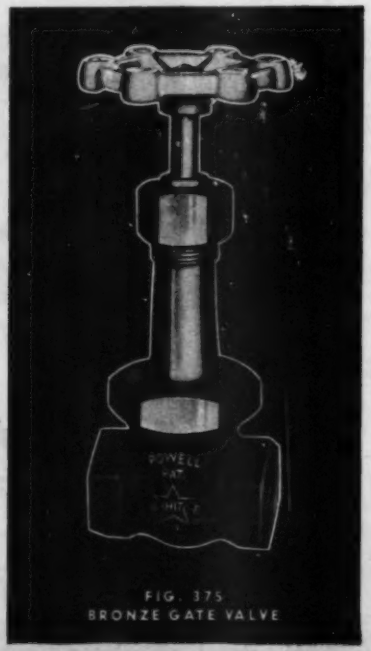


FIG. 375
BRONZE GATE VALVE

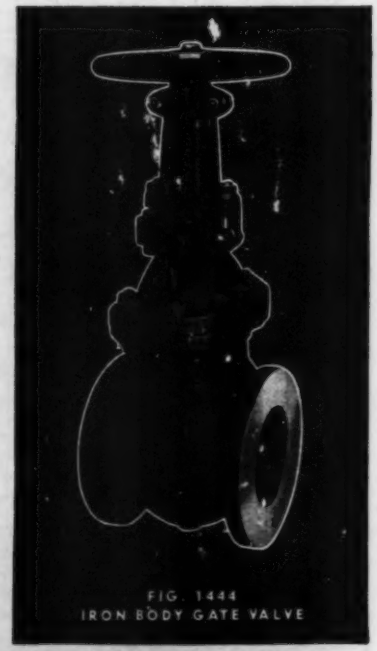


FIG. 1444
IRON BODY GATE VALVE

POWELL VALVES

THE WM. POWELL CO. CINCINNATI, OHIO

POWER

GENERATION + UTILIZATION + MAINTENANCE

This section turns the searchlight on power and its allied problems, showing big possibilities to save. Opportunities to improve conditions, methods, apparatus will be discovered. Worth while practices suggest new ideas and wider usages of equipment.

By W. S. JOULE

◆ Don't Devote All Your Attention to Boiler Tubes

Boiler tubes are not the only kind of tubes that are subject to scale deposits. In addition there might be mentioned superheater tubes, economizers, condensers, and feed water heaters. To obtain the highest plant efficiency it is just as important, perhaps, to keep these surfaces clean as it is to keep the boiler tubes clean. These surfaces may be cleaned in much the same manner as the boiler heating surfaces. Superheater tubes are of small section, usually not larger than 2 inches, but they may be cleaned with a smaller size of the ordinary type cleaner. Economizer tubes are not likely to become incrusted with hard scale. What scale does form does not become baked hard but remains in a soft, spongy condition and can, therefore, be removed easily. The cleaner frequently used for this purpose is the type having an external motor driving the operating head through a long square shaft. The motor is supported on a tripod that rests on the upper tube sheet of the economizer.

Condenser tubes are frequently of quite small section so that it is impossible to use either the cutter or vibrator type cleaner. In such cases a drill is used, driven by an external motor. Wherever there is a heat transfer to water, scale is likely to form, and having formed, it reduces the heat transfer and consequently the efficiency of the apparatus. To secure the highest possible over-all plant economy, then, it is essential that all heat transfer surfaces be kept always in the best of condition.

◆ IN DRILLING for taps, do not try to allow a full thread unless absolutely necessary. Don't forget that a half thread in a nut is stronger than the bolt or screw. By not allowing a full thread, the taps require much less power, seldom break, and can be more easily started square with the hole.

◆ Test for Alkalinity in Water

Either acids or strong alkalis may be injurious in boilers, the latter by causing iron plates to become brittle through an action not well understood and the former by causing corrosion. We must test for both. For the alkalis we need two test solutions. First, dissolve one gram of methyl-orange powder in 1,000 c. c. of distilled water. Second dissolve 40 c. c. of standard hydrochloric acid in 1,000 c. c. of pure distilled water and label the bottle in which you keep this latter "Standard Acid N-5." Put 200 c. c. of the water to be tested in a white porcelain dish; then rinse out the measuring flask with distilled water and pour the rinsings into the dish. Now add two drops of the methyl-orange solution and the water will turn a lemon yellow. Next add hydrochloric acid solution drop by drop from a measuring tube, stirring constantly with a glass rod until the color changes to a faint pink. The number of cubic centimeters of the hydrochloric solution used for this purpose gives the number of parts of calcium carbonate per 100,000. One of the most common forms of calcium carbonate is limestone or marble and when you get a calcium carbonate scale in your boiler you are giving it a marble lining, not so dense as that used for your switchboard panels, but not the kind of material with which boilers should be lined.

In passing, it should be noted that this test really gives a fair idea of the temporary hardness in the water. If this be subtracted from the total hardness as shown by the soap test, it will give an approximation of the permanent hardness or sulphates in the water.

In case it happens that the alkalinity test gives a result higher than the soap test, there is probably sodium bicarbonate or soda ash present, and the water should be given a careful chemical analysis. This excess of soda ash is likely to cause foaming and under the influence of heat and pressure may release sodium hydroxide which in time has an embrittling effect on the boiler plate.

◆ A GOOD protective coating for small articles to prevent rusting is made by diluting cheap varnish with two or three times its volume of methylated spirits. The parts are dipped, drained first in the dripping basket, and then spread out on a wire-mesh draining board. In about fifteen minutes the coating is hard and the parts are ready to pack.

◆ Test for Wetness of Steam

This is usually accomplished by drawing an average sample of the steam from the pipe near the boiler and determining the wetness by throttling to evaporate the moisture in the steam; or if the percentage of moisture is too great to be determined by this method, a separating device is used which will take out the moisture and this moisture and the steam of the sample, condensed, are then weighed and the weights compared.

One of the most important things in making these tests is to have a correct shape of nozzle and have it in the proper location so as to get a true average sample of the steam in the pipe. Experience has shown that the most satisfactory device is a piece of ½-in. iron pipe closed at the end which projects into the main steam pipe and perforated on the sides with 20 or more ⅛-in. holes, drilled in irregular or spiral arrangement, the hole nearest to the side wall of the main pipe being ½ in. from that wall and the nozzle being of a length to extend nearly across the pipe.

As to location, the nozzle should be placed well away from any pocket, where moisture can collect, for testing boiler steam preferably in a vertical run of pipe which comes direct from the boiler, at least 2 feet above any bottom elbow, since there is always a tendency for water to collect in such an elbow and to run up the outer side of the bend for a distance. If it is necessary to insert the sampling nozzle on a horizontal run, it should be put near the elbow which leads into the horizontal run and set vertically, extending upward from the bottom of the pipe.

◆ FOR THE TOP of the boiler, various coverings are used for heat insulation purposes, such as sand, brick, mineral, wool, asbestos and concrete. Where an insulating brick is used between the fire brick and the outer wall, this is frequently continued over the boiler and covered with asbestos paste and heavy duck. Some companies have used a concrete covering made up of a 1:2:4 mixture of cement, sand and gravel.

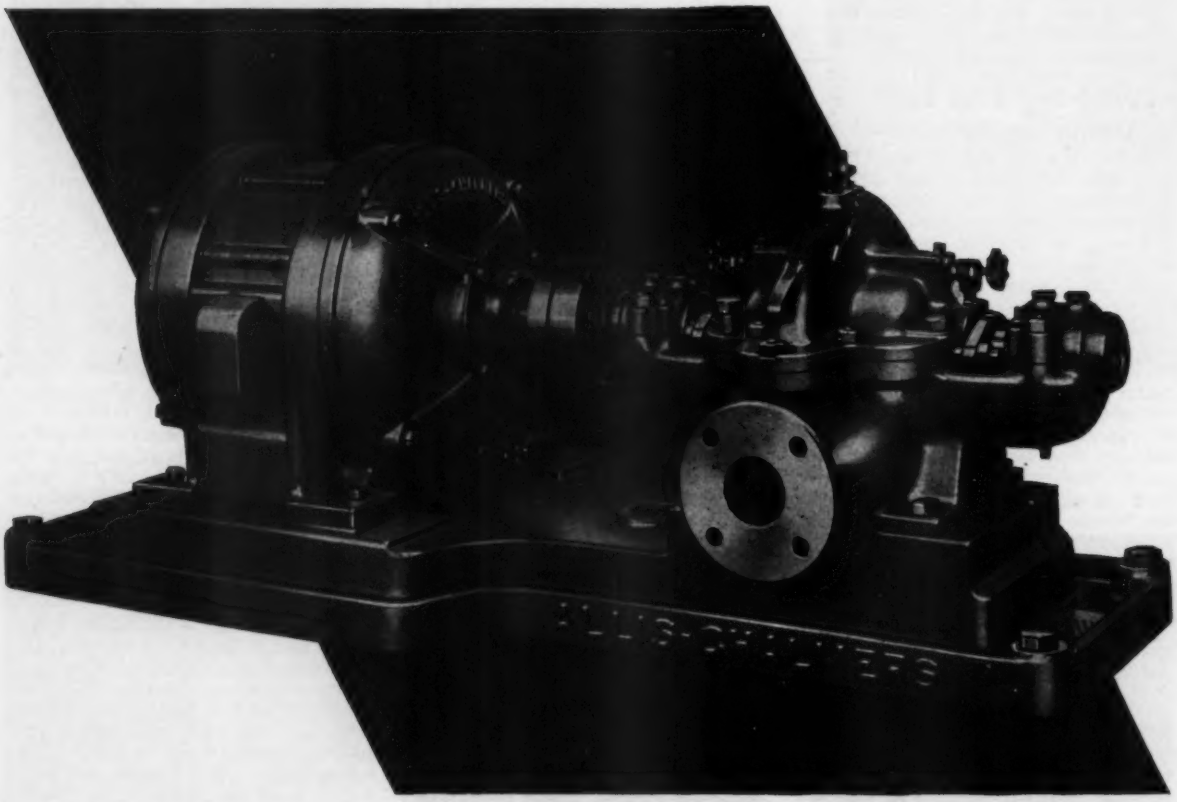
◆ WHEN HANDLING heavy work, it is best to be sure that the slings are safe. Rope slings are not so likely to slip as chain slings, and they generally give warning before they part. A rule covering the strength of chains which is easy to remember is: The number of eighths in the diameter of the iron in the chain, multiplied by itself and divided by 8, gives the safe working load in tons. For instance, a chain is made of ⅜-in. iron. Multiplying the 3 by 3, gives 9. Dividing 9 by 8 gives 1⅛ tons, the safe working load.

◆ ASH AND CLINKER that must be removed from the furnaces of power plants may weigh from 10 to 20 per cent of the total weight of the coal burned in the plant. For that reason, the cost of handling this refuse is a fairly large part of the coal cost, hence any reduction that can be made in this ash handling cost is reflected instantly in the cost of steam. Paper mills should consider this item.

A Good Pumping Unit

For Average Requirements—

30 to 50,000 gpm.



Centrifugal Pumps

The Allis-Chalmers line consists of low, moderate, and high head single stage pumps of 1" to 72" discharge, multi-stage pumps for working pressure up to 1500 pounds, high efficiency paper stock pumps, and pumps for special applications.

ALLIS-CHALMERS Centrifugal Pumping Units have a fine and sturdy appearance and they perform as well as they look. They are backed by half a century of experience in engineering and building good centrifugal pumps. You can depend on Allis-Chalmers Units.

The Type "S" unit, shown above, is one of the most widely used units for general purpose pumping. This type will handle capacities from 30 to 50,000 gallons per minute. It is an improved double-suction, split-casing, bronze-fitted, horizontal-shaft pump designed for long service and high efficiency at a reasonable cost.

Type "S" pumps are described in Bulletin 1650. Write for a copy.

ALLIS-CHALMERS

— Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, U.S.A. —

TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

IN THE PAPER INDUSTRY

◆ Lustre Finish

By applying an easily fusible coating to the surface of the paper and applying to this a covering of less fusible lacquer then, after drying the lacquer, heating in contact with a highly polished surface at a temperature slightly above the fusing point of the undercoating the latter melts and fills all unevenness of the paper surface. The less fusible lacquer prevents sticking to the heated surface. Subsequent cooling sets the fused surface to an even highly lustrous coating. German patent 624,595 Kl. 55f. Atlas-Ago Chemical Mfg. Co., through Wochnebl. fur Papierfabr. Apr. 4, 1936, p. 260.

◆ Antichlors—Pro and Con

One of the most difficult but at the same time most important of the operations in the manufacture of white pulp and paper is the complete elimination of the excess of the bleaching agents. When a solution of calcium hypochlorite is used it is absolutely necessary to avoid getting any excess of it into the beater with the pulp. It is a well-known fact that any negligence in this results in a gradual deterioration of the color and a weakening of the fiber which embrittles the paper although it may seem sufficiently strong at the time it is made.

Unfortunately, these effects do not appear for a long time after storage. Consequently, it is all the more important to take every precaution during manufacture. Various methods have been proposed for treatment of the bleached pulp, several of which are in every day use.

Simply adding an antichlor to the white pulp in the beater and then proceeding to color up the stuff is not a remedy without some danger. It is very easy indeed to destroy the excess of bleaching agent with a substance capable of reacting chemically with it and converting it into a different compound; but this latter must also be regarded with caution, a circumstance all too often neglected in paper manufacture.

The best known and most used of the antichlors is hyposulphite of soda. It appears to be generally assumed that addition to the beater of a quantity of this substance sufficient to destroy the excess of hypochlorite will accomplish the desired transformation and the pulp can be colored up and used forthwith. But, as a matter of fact, in the best papers where permanence of color, strength of fiber, absence of odor, durability and good appearance are required, the use of "hypo" as an agent for neutralization of excess bleaching material requires just as much care and attention as the bleaching itself. The reason for this is found in a study of the reactions produced when this substance is used.

Upon adding hyposulphite of soda to a solution of calcium hypochlorite, different compounds are formed depending on the concentration of the solution. Under usual conditions, the products are: hydrochloric acid, salt and calcium sulphate; but in very dilute solutions they are quite different; viz., salt, lime, caustic soda and sodium tetrathionate. The latter set of compounds are almost as detrimental as excess of chlorine in the pulp.

On the other hand, judicious use of "hypo" in just the right amount, avoiding all excess, can give good results *when done with great care*. The proper use of "hypo" can be controlled very easily by the starch-iodide test. As soon as the pulp fails to give the characteristic blue coloration no more should be added. But even with this precaution, it is necessary to wash the pulp sufficiently to remove the products of the reactions mentioned above. The amount of water required for this is much less than if no antichlor had been used.

The use of "hypo" has been replaced in some instances by sulphite. Thus the use of calcium sulphite offers some advantages. The reaction products are fewer and simpler; viz., calcium sulphate and calcium chloride. But it is necessary to eliminate the latter also by thorough washing since traces of chlorides in the bleached pulp, from whatever source, are detrimental, as they gradually attack the cellulose, converting it into non-fibrous oxidized cellulose.

Subsequent addition of alum complicates matters when the pulp is contaminated with chlorides, since aluminum chloride is formed and this exerts a very destructive action upon cellulose.

Other sulphites have been suggested; for example, sodium sulphite which can be prepared by adding calcium sulphite to a solution of sodium carbonate, or caustic soda. The preparation of an antichlor by boiling sulphur in milk-of-lime has been tried also. But its use would be even more detrimental than the evil it is intended to counteract. Slow oxidation of the sulphide to acid sulphite under these conditions brings about gradual destruction of the fibers.

Prevention is always better than cure and a durable paper is more easily made when the bleaching is properly done at moderate temperature, avoiding large excess of hypochlorite, and followed by washing with an abundance of good clean water. If, however, local conditions should not permit this, it might not hurt to resort to the use of antichlors provided the bleaching operations have not resulted in too large a residual chlorine which has to be destroyed. The use of the antichlor must be carefully regulated and no more added after the pulp ceases to give the characteristic blue coloration with the starch-iodide test. These precautions against an overdose are necessary not so much to avoid waste as to guard against the danger of retention of "hypo" in the pulp and subsequent reactions between it and other chemicals to be added during later operations which would impart a disagreeable odor to the paper.

One might suppose that such residual compounds could exist in the finished paper only in such minimal quantities that they could not be detected. But it is an established fact that most of the defects in paper from the standpoint of color, strength, odor, finish and durability result from the presence in the paper itself of chemical residues. Even though these residues may be present in extremely small amounts they are quite sufficient to displease the customer.

As a result of numerous tests and researches, it has been demonstrated that permanence and durability of paper cannot be attained unless the several operations such as cooking, bleaching, sizing and coloring are done in such a way that not a trace of the chemical agents used in the manufacture remains in the finished paper. **From La Papeterie, Feb. 25, 1936, p. 157.**

◆ Further Notes on Bleaching

Temperature Influence

(1) *Bleaching rate*—Nusbaum and Ebert found the rate of bleaching doubles for each 7.5 deg. C. rise in temperature. The author finds, however, this holds only for the principal reaction. In actual practice the acceleration is much less, especially at higher temperatures, on account of increased rate of loss of chlorine.

(2) *Chlorine demand*—The increased chlorine requirement at 20 deg. C. over that at 15 deg. C. amounts to 5 per cent.

(3) *Pulp damage*—Even at 55 deg. to 60 deg. C. there is no excessive deterioration of pulp quality. The copper number rises somewhat, it is true, but the yield falls very little. Particularly hard pulps may, therefore, be bleached for paper stock, but not for chemical uses, at 55 deg. to 60 deg. C., though the increased consumption of chlorine will make this more expensive. Opfermann

UNIFORMITY

APPLETON WOOLEN MILLS

Appleton Wisconsin

claims that in alkaline bleaching it is possible to work at higher temperatures, even up to 80 deg. C. (176 deg. F.), without fear of much damage to the pulp.

(4) *Heat of reaction*—The temperature rise caused by the bleaching reaction, according to the author's investigations, amounts to 3 deg. to 4 deg. C. for a 5 per cent chlorine consumption in hollander bleaching, and to 8 deg. or 9 deg. C. for high consistency operation.

Acid Bleaching

(1) *Acceleration*—Hypochlorite bleaching is speeded up by addition of acid. The former idea that in acid bleaching the pulp is damaged by hydrolysis has long since been disproved.

(2) *Inefficient*—Acid bleaching was developed by Hottenroth as an acid-alkali bleach. Since in acid bleaching there is no bleaching of coloring materials and alkaline bleach must follow to secure a good white pulp.

(3) *Superfluous*—According to Rys, it is possible to attain all the advantages of the acid pre-bleach, viz., shorter bleaching time, chlorine economy and better pulp, even more advantageously by using chlorine water. The acid hypochlorite bleach is, therefore, superfluous. The introduction of chlorine water constitutes really a new process.

(4) *Lower ash content*—According to Bradley and McKeefe (U. S. Pat. 1,768,820), especially hard pulps should be acid-bleached in the first stage. The Mathieson Alkali Works (Brit. Pat. 380,488) claim the bleaching should be at pH 3.5 to 5.0. Semskow and Pijaschkewitsch add HCl in bleaching pulp for rayon to get faster bleaching and reduced ash content. However, the pulp was somewhat gray.

(5) *Acid after-bleach*—The proposed use of chlorine gas for acidifying at the end specified in Ger. Pat. 281,581 and U. S. Pat. 1,470,556 by Ebie and Richter and also by Hansen, as well as the use of free hypochlorous acid at low temperature and consistency suggested by Wolf, lack every chemical consideration and are of no technical importance. The advantages claimed, viz., good white color and good fiber properties, are surpassed by alkaline bleaching with subsequent acid washing.

Catalytic Bleaching

(1) *Acceleration*—According to Wenzl bleaching can be speeded up by metals and their salts, especially nickel. In a molecular ratio of 1 chlorine to 2 or 3 caustic soda and the right concentration-ratio pulps of high purity can be obtained.

(2) *Pulp damage*—According to Kaufman the presence of heavy metals causes deterioration of the pulp. This is also to be feared in catalytic bleaching.

Alkaline Bleaching

(1) *Nature*—In alkaline bleaching enough alkali is added so that even the final stages of the reaction take place in alkaline medium.

(2) *Advantages*—This gives better chemical characteristics to the pulp, better strength and whiter color with less chlorine consumption.

(3) *Reasons*—The reasons for these advantages are: the chlorination products formed are more readily soluble in alkali; the resins are dissolved better; stronger oxidation and weaker chlorination, which is especially important in the final bleaching stage. Finally the formation of free hypochlorous acid is minimized or prevented entirely.

(4) *Retarding effect*—Bleaching is slowed down and better regulated. The retarding effect is directly proportional to the alkalinity. According to Opfermann, the addition of 1 per cent of alkali (1 kg. NaOH to 100 kg. pulp) prevents damage to the pulp at even 60 deg. to 80 deg. C. (176 deg. F.). Larger amounts of alkali retard the bleaching excessively without conferring any benefit.

(5) *Chlorine economy*—According to Yorston, alkaline bleaching saves 25 per cent of the bleaching agent for a 14 per cent bleach requirement.

(6) *Alkalinity regulation*—The alkalinity can be established in three ways:

(a) By adding enough alkali at the start to give a pH of 11 and then letting this exhaust itself.

(b) By later addition of NaOH with continuous pH control.

(c) By establishing a fixed alkalinity by means of buffer salts (MgO is best) which hold the pH at 8.8 to 9.2. This gives the best pulp.

(7) *Examples*—Richter and Schur (U. S. Pats. 1,858,525 and 1,858,523) use ½ per cent NaOH and 12 per cent to 15 per cent calcium hypochlorite and bleach in 8 hours. The Zellstoff-Waldhof (Ger. Pats. 537,846 and 549,402) specify less than 5 per cent NaOH or Na_2CO_3 for bleaching high purity cellulose at 10 deg. to 12 deg. C. The British Columbia Pulp and Paper Co. (Can. Pat. 296,841) bleach at a maximum of 25 deg. C., with alkalinity maintained by NaOH. And Genberg (Can. Pat. 301,097) specifies keeping the bleach alkaline to the end.

(8) *Alkaline Wash* — Intermediate washing with alkali during hypochlorite bleaching is an extension of multi-stage bleaching. After the first stage the pulp is washed with water and then with dilute alkali solution. This dissolves all the water-insoluble chlorination products and also small amounts of other materials. Some economy of chlorine results, but the author's investigations have shown this is not enough to compensate the cost of the intermediate wash. The same result is obtained better and more cheaply by addition of alkali to the bleacher. This intermediate alkali wash, first described by Opfermann, forms the basis of several new patents: Champion Fibre Co. (U. S. Pat. 1,771,064) specifies use of a 5 per cent to 12 per cent caustic soda lye in a 5 per cent to 10 per cent pulp consistency; Zellstoff-Waldhof (Ger. Pat. 539,401) for high purity cellulose specifies an intermediate wash with alkali or carbonate liquor instead of bleaching in the presence of alkali. British Columbia Pulp and Paper Co. (Can. Pat. 296,841) employs 2 per cent to 10 per cent caustic soda for 20 to 40 minutes for the intermediate wash. And Martynow washes with ½ per cent caustic soda at 50 deg. C. for 1½ hours.

(9) *Alkali pretreatment* — Pretreatment of the pulp before bleaching with a cold dilute alkali solution is unprofitable. Bleaching removes principally lignin. With cold dilute alkali, however, only traces of lignin are removed. It is only with hot concentrated alkali in large quantities that lignin can be brought into solution. This, however, is not bleaching but only a very expensive purification of the pulp.

(10) *Fiber strength* — Bleaching at first increases the strength, then later lowers it. Recent investigations on this have been made by Wenzl and by Nakashima and Oinuma. According to Ristenpart, fiber strength is not injured by addition of H_2SO_4. Baird and Doughty state that fiber strength suffers but little by an increased chlorine consumption from 12.3 per cent to 17 per cent and a temperature rise from 20 deg. C. to 50 deg. C. According to Cirves, single stage bleaching gives the highest alpha content, but 2-stage gives the best color and strength. Munds says that folding endurance suffers most of any of the properties upon overbleaching. Alkaline overbleached pulps, even at elevated temperatures, have much better strength properties than neutral or acid bleached.

Chemical Characteristics

To obtain good chemical characteristics, especially of pulps for rayon, multi-stage bleaching is essential and the temperature should not exceed 35 deg. C. (95 deg. F.) or at the utmost 40 deg. C. (104 deg. F.). Wenzl prefers sodium hypochlorite. Yorston says higher viscosity is obtained with 2-stage than with single stage bleaching. Fabrizi investigated the relationship between chlorine consumption and copper number. He found the lowest copper number in 2-stage bleaching with a chlorine ratio of 3.5 to 1 (i. e., 78 per cent of the chlorine in the first stage. Nakashima and Oinuma have established the relationship between temperature, chlorine consumption, pulp consistency and chemical characteristics. High consistency affects these adversely. According to Lewis, bleached rag pulp is more resistant to calcium hypochlorite than is bleached sulphite. The beta-cellulose of the latter is rendered insoluble by oxidation, consequently the alpha-cellulose suffers in proportion.

Acidification

Acidification after bleaching is completed is often suggested because this improves the technical properties and the ash content is reduced. According to Mund, this is particularly advantageous after bleaching with calcium hypochlorite for rayon pulp. On the other hand, Semskow and Pijaschkewitsch claim treatment with HCl *before* bleaching is superfluous. Instead of HCl sulphurous acid or bisulphite liquor

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RAG AND STOCK CUTTERS

is often used for acidifying. These have the advantage of serving as antichlor also. Formerly the acid was added in the hollander with drum washer after the pulp had been washed with cold water. The acid was put in and the pulp washed again. In modern bleaching methods the hollander is not used any more so the acid is added to the dump chest. When double washing is used the acid can be run into the second vat. It is an open question whether acid is needed for a well washed pulp.

Shrinkage

According to the author's researches in the multi-stage bleaching of sulphite there is an average pulp loss of about 0.75 per cent for each 1 per cent of chlorine consumed. Therefore with the aid of Noll's tables it should be possible to establish a relationship between the degree of purification, resin- and lignin-content, chlorine consumption and pulp yield.

(To be continued)

◆ Bleaching with Oxidants

The degree of cooking of an unbleached wood pulp is evaluated by determining its lignin content by means of chlorine or permanganate in an aqueous suspension of the pulp. Permanganate oxidation may take place in various ways according to the conditions and may even attack the cellulose itself on prolonged action. The pulp finally obtained is white. On the contrary chlorine at atmospheric pressure is absorbed in a few minutes by about its own weight of lignin and in a definite manner. It has the disadvantage of forming with the lignin a product of yellow color.

The ratio of permanganate index to the Roe number (chlorine index) is constant and equal to 5 for sulphate pulp. Expressed in chemical equivalents the quantity of permanganate is double that of chlorine. But a lignin saturated with chlorine does not require more than half this amount of permanganate to become perfectly white.

For sulphite pulp the ratio, always constant, is not 5 but 3.75. This difference which was thought to come from the greater resin content of the sulphite pulp, since the resin is not attacked by chlorine, is really due to a difference in chemical constitution of the lignin in the case of the two pulps. A combination of treatment with chlorine and with permanganate will give good results.

H. Ahlquist, Svensk Pappers-Tidn. Jun 20, 1935 through Le Moniteur de la Papeterie Francaise, Apr. 1, 1936, p. 161.

◆ Improvement in Manufacture of Impermeable Paper

The improvement consists in dispersing titanium oxide, or similar pigment of high opacity, in the usual impregnating materials, such as paraffin, natural or synthetic wax, resins, etc., in order to minimize transparency. Since the materials do not "wet" the pigment, a dispersion agent is needed. For this the inventor uses: polycyclic alcohols and their fatty acid esters; polyamines and their fatty acid esters; amino acids; certain materials derived from animal organisms like brains, bile, egg yolk and substances prepared from them; that is, cerebrin and bilirubine. Especially good results have been obtained with cholesterine, lecithine and triethanolamine stearate.

The dispersing agent may be added directly to the impregnating material, or previously dispersed in a substance soluble in the lattter, such as lanolin, vaseline, etc. The dispersion of the pigment is best effected by stirring into the melted impregnating material while the latter is cooled to the solidifying point. Repeated melting, stirring and congealing aids the dispersion. Kneading the hard friable mass in a crutcher also aids the dispersion. The pigment must be thoroughly dry, as moisture interferes with the dispersion.

Example 1: 70 kg. paraffin is melted at 60 deg. to 65 deg. C. and 100 to 250 g. cholesterin, or an equal amount of a mixture of cholesterin, lanolin and vaseline, is added followed by 30 kg. of titanium oxide. This mixture is vigorously agitated while it cools until it hardens. This gives a suspension suitable for preparing 300 kg. of paraffin with 10 per cent titanium oxide, or 600 kg. with 5 per cent, according to the following procedure: 15 kg. of the above mixture is melted and 75 kg. pure paraffin added. This should be stirred until a paper sample dipped into it (at about 60 deg. C.) is coated with a smooth opaque covering. If the coating is lumpy the insufficient dispersion may be corrected by cooling with constant agitation until it sets, repeating if necessary.

Example 2: 95 kg. of paraffin is melted with from 10 g. to 20 g. cholesterin and 5 to 10 kg. titanium oxide added. This is chilled to 10 deg. or 12 deg. C. with constant agitation. The mass is then re-melted, agitated and re-chilled. If necessary, this may be repeated two or three times.

Fr. Pat. 793,703 to Societe Industrielle du Titane through Le Moniteur de la Papeterie Francaise, Feb. 15, 1936, p. 83.

◆ Papers for Impregnation with Synthetic Resins

Ever since the discovery of synthetic resins they have been used for impregnating papers to form hard molded articles. The properties of the resins and of the resulting products have been thoroughly investigated, but the choice of the paper has been left largely to chance. The paper should be above all free from groundwood, bark, shives, metal particles, etc., and from acid. For this reason it is preferable to use soda pulp with, pehaps, up to 50 per cent of clean, well washed sulphite. The best papers for this purpose should be dense and strong yet fairly absorbent. Any sizing should be with rosin. Latex is positively out. Wochenblatt fur Papierfabrikation, 1935, No. 37, p. 696, through La Papeterie, Mar. 25, 1936, p. 263.

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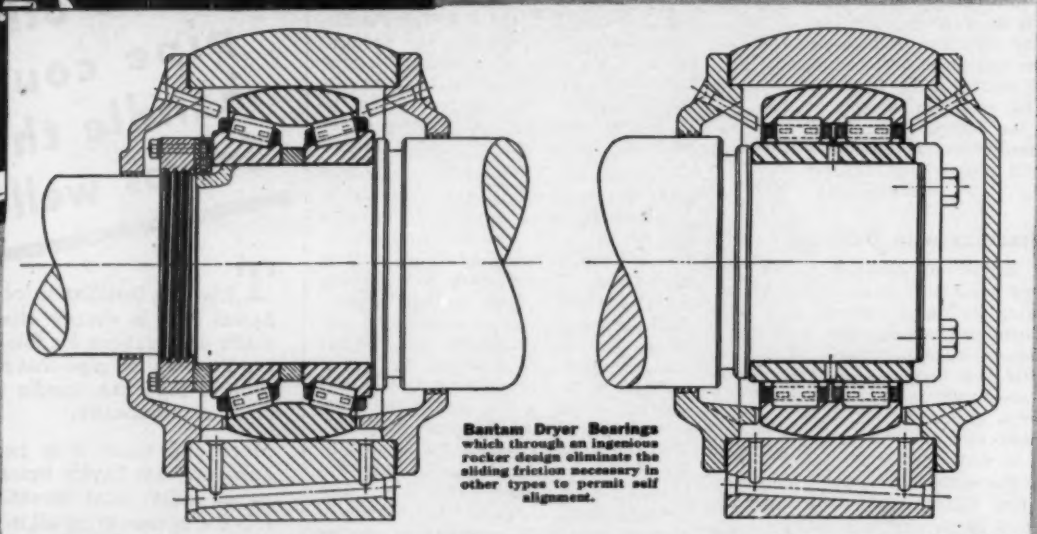

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Inquiries with reference to any of these patents should be addressed to James Atkins, Munsey Building, Washington, D. C.

Compiled by James Atkins, Registered Patent Attorney

2,031,035—Method of Making Moistureproof Paperboard and the Like. Carl G. Dreymann, Pittsburgh, Pa., assignor to Grant Paper Box Company, a corporation of Pennsylvania. Application October 11, 1933, Serial No. 693,110. 3 Claims. (Cl. 154—40). The method herein described of forming a multiple-ply sheet of moisture-repellant cardboard, paper-board, and the like, which consists in spreading superficially upon a ply of paper an uninterrupted film of a thermoplastic, moisture-proof adhesive, in heated and fluid condition, bringing such filmed ply, while the film superficially continues in fluid condition, together with a second ply, into a roll-pass of a width equal to the combined thickness of such components, whereby union is effected without compression, allowing the united article to cool to the point of stiffening of the film material, and, finally, at such temperature, subjecting the article to consolidating pressure.

2,031,485—Method of Bleaching Pulp. Hans John and Clarence C. Le Febvre, Appleton, and Horace Du Bois, Neenah, Wis., assignors to Paper Patents Company, Neenah, Wis., a corporation of Wisconsin. Application May 20, 1931, Serial No. 538,650. 30 Claims. (Cl. 8—2). A process of bleaching cellulosic material and the like, comprising prebleaching said material under acid conditions in a hypochlorite bath, washing and thickening the pulp, subjecting it to a second bleaching operation under alkaline conditions maintained throughout the stage and with a sufficiently high concentration of hypochlorite bleach so that an excess thereof remains at the end of the second stage, substantial agitation being avoided throughout the second stage, thickening the material and removing a large portion of the excess of bleach remaining at the end of the second stage, adding water to the thickened pulp so as to produce a low consistency and low bleach concentration, adding sufficient acid to render the mixture distinctly acid, allowing the mixture to react under said conditions with substantially no agitation until the bleaching is completed, and then neutralizing the bleaching agent and washing.

2,032,211 — Paper Coating Apparatus and Method. Lloyd Hornbostel, Beloit, Wis., assignor to Beloit Iron Works, Beloit, Wis., a corporation of Wisconsin. Application March 3, 1934. Serial No. 713,870. 8 Claims. (Cl. 92—68.) Apparatus for coating paper with a thin film of mineral coating comprising a drier cylinder, roller means forming with the cylinder a nip containing fluid coating material for applying said material evenly to the surface of said cylinder at one point, the cylinder being arranged to be heated to dry the film, and means at a point circumferentially spaced from the first point, a distance sufficient to enable partial drying of the film of coating material in its travel therebetween, for transferring the partially dried film directly from the surface of the cylinder to a moving surface to be coated.

2,032,615 — Paper Making. Clark T. Henderson, Burlingame, Calif. Application December 28, 1933. Serial No. 704,332. 3 Claims. (Cl. 92—21.) A method of preparing wood pulp for paper making which comprises forming a mixture of incompletely bleached raw kraft pulp in a major proportion with a minor proportion of a fully bleached raw sulfite pulp and beating the mixed pulps to a condition of freeness suitable for paper making.

2,032,385—Safety Paper and Process For Making It. Frank S. Wood, Newton, Mass., assignor to Frank W. Wood, Astoria, N. Y. Application August 16, 1933. Serial No. 685,492. 3 Claims. (Cl. 92—21.) A banknote safety paper comprising a variably tinted base or body color and a relatively small quantity of colored fibers of the same material, dyed in water-soluble, fugitive dye and of a nature to be attractively distributed throughout the base in the form of an unrepeating infinity of irregular colored lines adapted to disappear upon eradication, said safety paper having a nature that excludes the necessity for all other dyeing and surface marking steps and requires no processing or surface-marking subsequent to its formation in the web. The process of manufacturing a banknote safety paper comprising: (1) Dyeing a relatively small quantity of pulp with a water-soluble, fugitive dye adapted to create a delicately tinted paper by means of an infinity of irregular, colored lines into which said colored pulp is transformed by mixing; (2) preparing a relatively large quantity of uncolored, identical pulp adapted to be created into a delicately tinted paper by mixing with colored pulp; (3) the mixing of said colored and uncolored pulps at a stage in the paper making previous to the web formation, whereby said mixing creates a delicately tinted paper of infinite variation in design of a nature that obviates the necessity of processing or surface-marking subsequent to the web formation and excludes the necessity for all other dyeing or surface marking steps.

2,032,645 — Absorbent Paper Product and Process of Producing the Same. Merrill A. Youtz, Green Bay, Wis., assignor to Northern Paper Mills, Green Bay, Wis. Application August 18, 1933. Serial No. 685,786. 1 Claim. (Cl. 92—40.) The method of decreasing the normal loss of absorbency in unsized absorbent paper toweling when such toweling is stored for periods of six months or longer which consists in incorporating in the freshly-made toweling prior to storage thereof a small amount, of the order of .05 to 0.2 percent, based on the weight of the paper, of an organic material classed as a wetting agent and being chosen from the group consisting of sulfated and sulfonated oils, sulfonated rosin distillates, alkyl sulfates of higher alcohols, alkylated naphthalene sulfonic acids, and salts of these substances, said salts also being wetting agents, said paper towel containing the wetting agent displaying substantially no increase in absorbency when compared with paper toweling from the same stock but which does not contain said wetting agent.

2,032,816 — Method of Making Safety Paper. Burgess W. Smith, Rochester, N. Y., assignor to The Todd Company, Inc., Rochester, N. Y., a corporation of New York. Application August 25, 1932. Serial No. 630,451. 5 Claims. (Cl. 91—67.95.) The method of producing safety paper comprising wetting said paper with a solution of a dye, pressing said paper between a pair of rolls one of which has its surface formed with a pattern to mark the paper and remove the surplus solution, printing from a separately inked surface a warning symbol on the surface of said wet paper with a water-miscible ink other than said dye, which ink is initially illegible and contains a substantially colorless compound adapted to be darkened by the action of an ink eradicator, and drying and finishing the paper surface so that said warning symbol is not readable.

2,033,123—Method and Apparatus for Refining Paper Stock. Edwin Cowles, Cleveland, Ohio, assignor to Cowles Engineering Corporation, Sewaren, N. J., a corporation of New Jersey. Application May 17, 1934. Serial No. 726,025. 7 Claims. (Cl. 92—20.) Apparatus for refining paper stock, comprising, in combination, means providing a closed treating chamber having inlet and outlet openings through which stock is flowed continuously, a screen therebetween having openings of such restricted size as to cause an increase in concentration of solid material in said chamber over that of the stock flowing into and out of said

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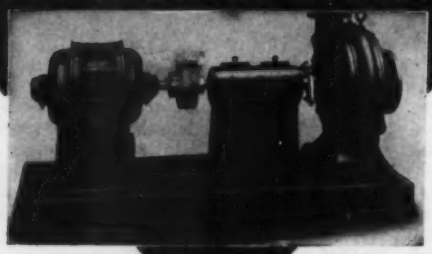

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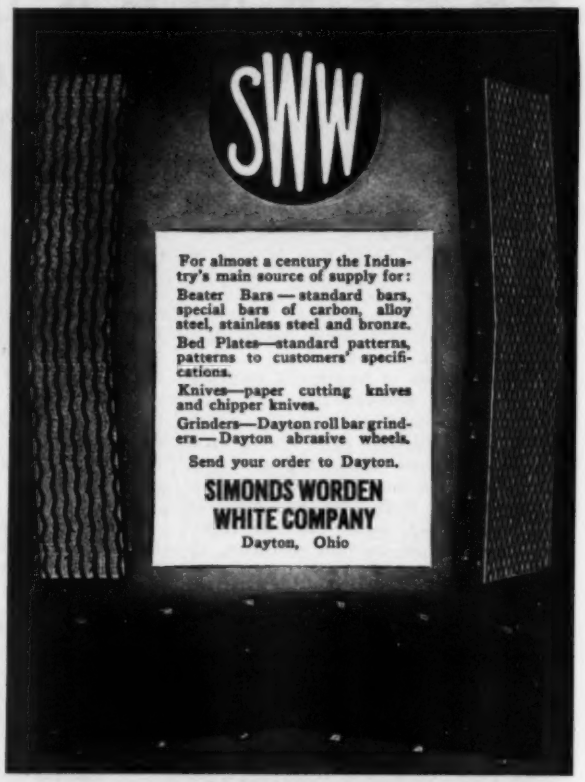
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chamber, and means moving in close proximity to said screen for agitating the contents of said chamber and for clearing the openings of said screen to permit treated material to pass through.

2,034,232 — Apparatus for Producing Safety Paper. William H. Grogan and Frank C. Ladd, Turners Falls, Mass., assignors to Keith Paper Company, Turners Falls, Mass., a corporation of Massachusetts. Application September 13, 1933. Serial No. 689,218. 3 Claims. (Cl. 92—40). In an apparatus for incorporating planchets in a paper web during its formation upon a Fourdrinier wire, a collecting tank for white water, a pair of storage tanks, means for delivering the white water from the collecting tank alternatively into one or the other of the storage tanks, a third storage tank, means for delivering the liquid from either of the first two storage tanks to the third storage tank, a pipe leading from said third storage tank at an intermediate elevation thereof, means for delivering liquid from said pipe to the first two storage tanks to thereby preserve a constant level in the third storage tank, means for agitating the liquid in each of the storage tanks, a delivering tank extending across a Fourdrinier wire, one or more ducts leading from said delivering tank in a sinuous path to a point above the partially formed web on the wire, and one or more pipes leading from the third storage tank to said delivering tank.

2,033,481—Paper Manufacture. George A. Richter, Berlin, N. H., assignor to Brown Company, Berlin, N. H., a corporation of Maine. Application November 15, 1933. Serial No. 698,126. 6 Claims. (Cl. 91—68). Paper of high absorbency, porosity, and wet strength, containing a hydroxy ether of cellulose distributed substantially uniformly throughout its body only as thin films deposited on and integrating its fibers, said ether being present in such amount as not to detract appreciably from the proposity of the paper base.

2,033,954—Paper Manufacture. Harold Robert Rafton, Andover, Mass., assignor to Raffold Process Corporation, a corporation of Massachusetts. Application January 26, 1932. Serial No. 589,043. 6 Claims. (Cl. 91—68). A filled paper whose ingredients include fibrous material and a filler comprising calcium carbonate magnesium basic carbonate, the particles of which filler are substantially all of very fine point-like shape, and in which filler the calcium and magnesium radicles are present in substantially equimolecular proportions.

2,034,402—Head-Box Construction. Ernest A. Leloff, Cloquet, Minn., assignor to The Northwest Paper Company, Cloquet, Minn., a corporation of Minnesota. Application December 13, 1933. Serial No. 702-181. 19 Claims. (Cl. 92—44). In a paper-making machine having a head-box, the combination with the front wall of the head-box which forms an opening for the discharge of pulp slurry, of a horizontal elongated member mounted to lie inside the head-box, said member presenting a surface extending upwardly and rearwardly from the opening.

2,034,435 — Coated Paper. Clark C. Heritage, Rumford, Maine, assignor to Oxford Paper Company, a corporation of Maine. Original application October 26, 1932. Serial No. 639-735. Divided and this application April 10, 1933. Serial No. 665,339. 6 Claims. (Cl. 91—68). The process for making a coated paper comprising mixing together a base pigment, lime and water, adding to the slurry so formed a solution of an alum, adding an alkali to the reacting mixture, adding an adhesive to the mixture, and coating the composition upon paper.

2,032,437 — Fiber-Liberating Process. George A. Richter, Berlin, N. H., assignor to Brown Company, Berlin, N. H., a corporation of Maine. Application October 11, 1934. Serial No. 747,922. 21 Claims. (Cl. 92—11.) A process of pulping raw cellulosic material which comprises impregnating a mass of such material while under confinement with ammonia fumes, adding sulphur dioxide and water to the ammoniated mass to form ammonium sulphite pulping liquor in situ therein, and cooking the mass in the resulting liquor to form pulp.

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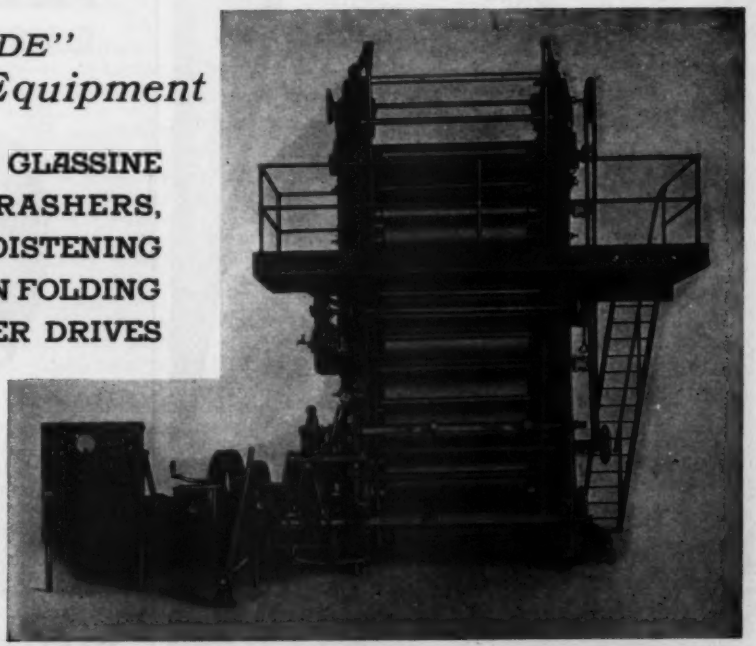

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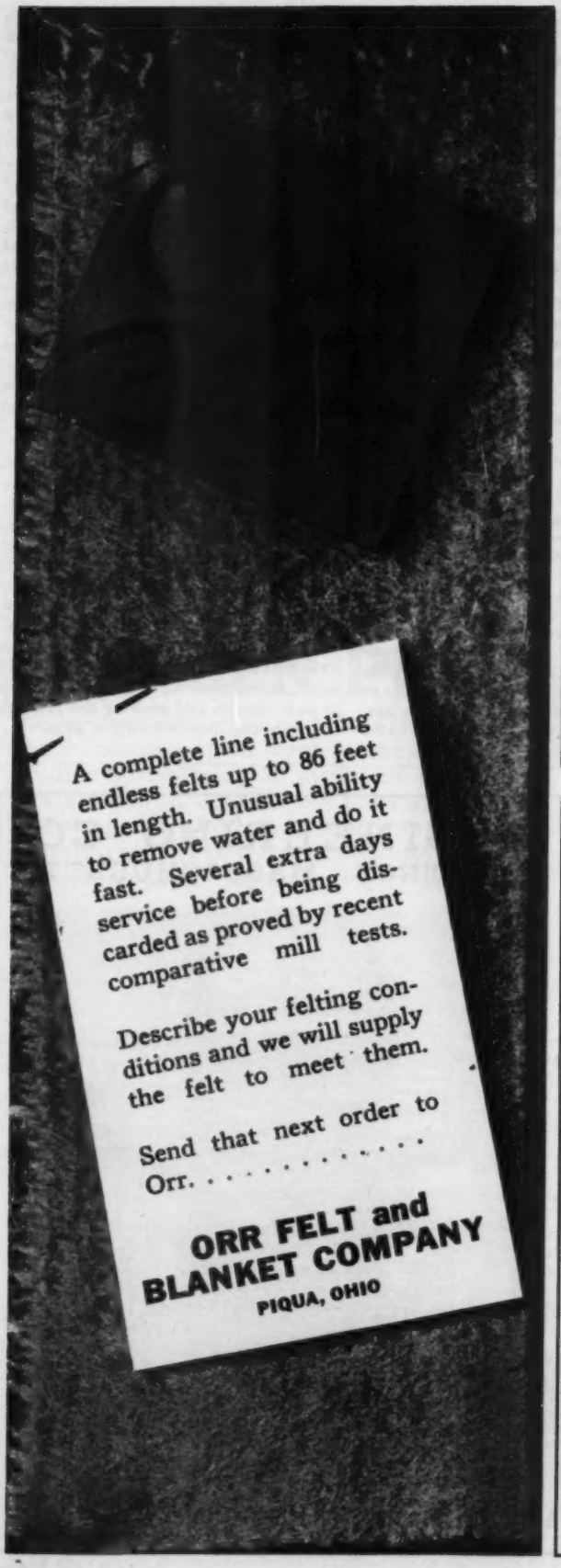
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The COMMERCIAL OUTLOOK

New York, June 1, 1936.

DESPITE the fact the slow summer period is approaching, the paper market remains moderately active and paper and board mills continue fairly busy. The situation within the industry is somewhat irregular. There are some groups of mills operating at a good pace while experiencing an excellent call for their product, whereas others are not so well engaged since their market has quieted. This latter is due in large part to seasonal circumstances. Taken as a whole, the industry is enjoying a greatly improved demand compared with this time in the last few years, and production of paper and board is running well above the past several years.

Newsprint mills in the United States and Canada are speeding along at a brisk rate, turning out a near record volume of their product, and shipping paper about as rapidly as it comes off the machines. By way of example, mills in Canada manufactured more newsprint in April than ever before in that month, and United States mills registered the third consecutive monthly small increase in output.

Board mills have been exceptionally busy, although many of them have curtailed to some extent in recent weeks owing to a seasonal slackening of market demand. Wrapping paper mills are active and in all likelihood making a new high record of production, with the consuming market absorbing production readily. Writing paper plants are passably active, as are book paper and tissue mills. Building paper manufacturers are producing on a large scale; all reports tell of an excellent demand for roofing felt and of mills running at close to full capacity.

The price situation is not by any means altogether satisfactory. While most divisions of the industry are working under a price set-up enabling them to eke out a fair margin of profit, some are finding it next to impossible to cover costs at prevailing market levels. The tendency in this connection, however, is in the right direction, and opinion within the trade is that much desired improvement in prices will be seen over the balance of the year. Rumors are sifting through, mainly originating in Canada, of the probability of a substantial rise in the newsprint contract basis at the end of 1936. Board prices have adopted a more favorable trend lately, and fair stability is noted in writing, wrapping and book paper market values.

A consensus of belief in the trade is that further steps forward will be taken by the paper market in the autumn and early winter, that demand will undergo considerable expansion and that the industry's production will score additional increases of appreciable scope and significance. Few within the industry seem to be worried regarding the national election this fall insofar as its possible effects on demand for paper; in fact, it may be said a large majority feel that consumption of paper of various kinds will be substantially stimulated, leading to a growth of demand. Moreover, there is no denying that industry and trade in general are forging ahead, steadily albeit gradually, and that paper demand will continue to share in this improvement is confidently anticipated.

Newspaper advertising for the month of April showed an increase of 4.3 per cent over March, according to the index of newspaper advertising published by Printers' Ink. This represents the change in April newspaper linage from March after the usual adjustments including correction for seasonal change. For April, 1936, the index stood at 85.0, compared with 81.5 for the preceding month, and a rise of 8 per cent contrasted with a year ago when the index registered 78.7.

Newsprint production in the United States gained in April for the third consecutive month, to add to the large increase in output by Canadian mills, with the result that total output of mills in both countries rose 12.8 per cent, according to News Print Service Bureau figures. Canadian mills in April turned out more newsprint than ever before in that month, with the month's production of 258,721 tons exceeded only twice in any month in the history of the Canadian industry. Those peaks were in October and November last year. Gains by United States mills continued slight, the output totaling 76,470 tons in April, against 74,891 tons in the similar 1935 month.

The maintained high rate of newsprint production by Canadian mills since the first of the year has put the total for the first four months far above any total for a similar previous period. In the first four months of this year Canadian mills manufactured 952,145 tons, compared with 810,190 tons in the corresponding time of 1935, an increase of 141-955 tons or 17.5 per cent. The former high mark was established in the first four months of 1929, when 840,-677 tons were produced. United States mills turned out a total of 304,590 tons in the first four months of 1936, against 299,890 tons a year ago in the same period.

Shipments ran well ahead of production during April, Canadian mills shipping 267,296 tons of newsprint and U. S. mills 77,546 tons. As a result mill stocks decreased to 102,716 tons at the end of April, against 112,367 tons a month before, and contrasted with 79,130 tons at the end of April last year. There was still considerable tonnage waiting later water shipment, the Bureau reported.

Production of paper board in the United States is registering a steady and fair gain over a year ago. March output reached 285,257 net tons, compared with 271,107 tons in the month preceding and 275,770 tons in the similar month of 1935. Board mills produced at 69.4 per cent of their rated capacity in March, compared with 68.4 per cent in February this year and 69.1 per cent in March last year. During the first three months of the current year, board mills in this country produced a total of 827,292 tons, according to the Census Bureau's report, constituting a rise of 37,626 tons, or 4.7 per cent, above the 789,666 tons produced in the same period of 1935, and was a larger increase or 103,771 tons and 14.3 per cent over the 723,521 tons produced by identical mills in the first quarter of 1934.

Paper board mills produced at 67.0 per cent of their rated capacity during the first three months of this year, against 66.8 per cent in the same time of last year, and 62.0 per cent in 1934. Board output in each of the first three months of the current year recorded a gain over the corresponding month a year ago. New orders for board received by mills in March called for a total of 290,854 tons, against 268,843 tons in the preceding month and 268,360 tons in March, 1935, and stocks on hand at mills at the end of March were 96,202 tons, compared with 91,917 tons a month previously and 79,049 tons at the close of March a year ago.

◆ ◆

◆ Fiber Board to Be Manufactured From Bagasse in Australia

The production of fiber from bagasse will soon be undertaken in Australia, according to information recently brought to the attention of the Australian Tariff Board. At present, all such fiber board is imported, principally from the United States and Hawaii.

The announcement of plans to manufacture fiber board in Australia was made when the Tariff Board was considering a request for lower tariff rates on imported board. The request for lower duties was refused, because of plans for the manufacture of fiber board in Australia. Commenting on the new plant which is to be erected here, the Tariff Board said that it was anticipated that the necessary machinery will be installed for operation before June of the current year. A large sugar mill in Queensland is capable of supplying ample raw material from which to manufacture sufficient fiber board to meet the present Australian requirements.

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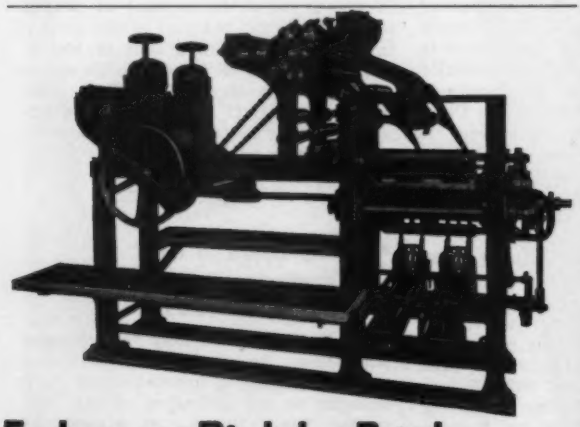

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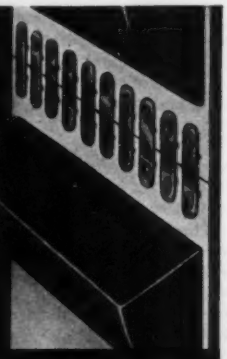

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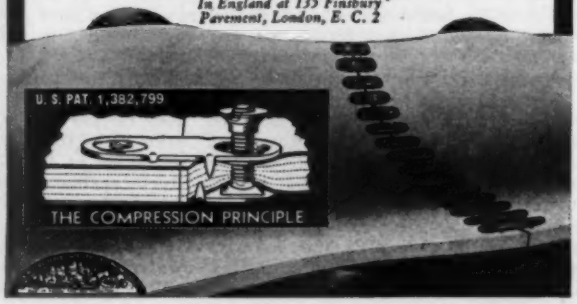

Domestic RAW MATERIALS

◆ Papermaking Rags

There are visible signs that incoming supplies of papermaking rags, of at least some classes, are increasing. This is particularly true as regards old rags, and perhaps applies to a lesser degree to certain new grades of rag material consumed by paper mills. The result is that prices almost all along the line have eased, and now evince a softer tone than has been noted in a lengthy while.

It would appear that people are purchasing more clothing and by the same token are discarding more worn-out raiment. Thus, more old rags are reaching the market. It is said in some quarters of the trade that the influx of old rags has shown a decided increase. Also, it is stated that production of new garments has expanded, and therefore larger quantities of new cotton cuttings are becoming available. Another factor in the situation is that Europe has shipped large amounts of old rags, principally roofing stock, to the United States in recent months, thus adding appreciably to the supply here.

Paper manufacturers have let down in their buying of rags in numerous cases, and the market is much quieter. There is a certain amount of routine purchasing but the demand seems to have lost its snap, and with sellers more on the defensive and somewhat eager for orders, mill buyers are enabled to operate in the market at lower prices. Roofing rags have been chiefly affected by the downward course of the market and are selling in the East at 1.85 cents a pound for No. 1 domestic roofing stock and 1.60 cents for No. 2 classification roofing f.o.b. dealers shipping points. Probably roofing paper manufacturers have in exceptional cases bought a little under these prices. Foreign roofing stock has eased to where felt mills bid only 1.80 cents a pound ex dock American Atlantic ports for dark colored cottons for forward shipment from abroad, though it is admitted they are not successful in getting much supply at this price basis. On the other hand, it appears likely foreign dark cottons of mid-European origin and quality could be secured fairly freely at about 1.90 cents or but a bit higher.

New No. 1 white shirt cuttings have moved approximately half a cent per pound lower. Many dealers ask 8.25 cents or higher a pound delivered paper mills, but purchases have been made by papermakers at 8 cents and probably at 7.75 cents on a delivered basis. New unbleached muslins are reported available to mills at 7.75 to 8 cents f.o.b. shipping points, new light silesias at 5.75 to 6 cents, fancy shirt cuttings at 3 cents, washables at 2.75 cents, new blue overall cuttings at 6.50 to 6.75 cents, and new khaki cuttings at 4.50 cents.

Old No. 1 repacked whites are quoted at 3.25 to 3.50 cents per pound f.o.b. dealers' points, and repacked thirds and blues at 2.35 to 2.50 cents. These prices might be shaded by buyers in some localities and depending, of course, on the source and packing of the rags concerned. On the whole, there does not seem to be any great surplus of rag stock of any description on the market, but the combination of some increase in supplies and retrenchment in demand has brought about the sagging price trend.

◆ Old Paper

No important revisions are taking place in old paper prices. There is some narrow fluctuation but they are of limited consequence. The general market situation seems healthy. Sellers are getting fairly steady prices for practically all grades, whereas board mills and other consumers are covering their wants at comparatively advantageous cost levels. The answer apparently is that just about all the material reaching the market is finding a ready sales outlet among consuming plants, so that there is limited pressure to sell and yet no surplus hanging over the market to undermine ruling values.

No. 1 hard white shavings are bringing 2 to 2.25 cents a pound in the East f.o.b. shipping points, No. 1 soft white shavings 1.85 to 2 cents, one-cut soft white 2.20 to 2.35 cents, white ledger stock 1.10 cents, No. 1 old kraft paper 1.05 to 1.15 cents, No. 1 heavy books 55 to 60 cents per hundred pounds, and white blank news cuttings 1.20 to 1.30 cents a pound. No. 1 mixed paper has stiffened in price in the East to 25 cents a hundred pounds at dealers' points, and folded newspapers to 35 cents. Prices in the Middle West on mixed and news range a little above these figures.

◆ Rope and Bagging

Old rope prices have evinced a disposition to fluctuate to some extent, and are rather unsettled. Paper manufacturers seem fairly eager for old manila rope and satisfied to pay about 2.25 cents a pound for No. 1 domestic rope at shipping points, with some mills said to be granting above this price. Dealers, however, contend there is a very restricted available supply of old manila rope, and in most instances demand substantially higher values, frequently asking 2.50 to 2.60 cents and more, and refusing to sell for less. Foreign old manila in particular is reported held for 2.60 cents and higher ex dock New York or other American Atlantic ports. Old sisal and soft jute strings are freely sought and are very firm quotably.

Demand for bagging, on the other hand, has subsided and prices have moved at least slightly lower. No. 1 domestic scrap bagging is now about 1.90 cents a pound, or a little less, f.o.b. shipping points, and No. 1 domestic gunny 2 to 2.05 cents. Imported material usually runs a little above these prices.

◆ Pulpwood

Pulpwood demand is reported moderate though activity in the commodity at present has to do chiefly with shipments on contracts. Quoted rates are maintained and exhibit steadiness of tone.

◆ Mechanical Pulp

Groundwood prices are well maintained and display firmness even though the market is developing rather limited activity, at any rate on its surface. Consumers in the United States several months ago were absorbing groundwood supplies from Canada freely, but seem to have let down in their takings recently, nor is there much call for European groundwood. It would appear improved water conditions have enabled many consumers to increase their own output of groundwood, thereby permitting them to withdraw from the open market as buyers. Domestic groundwood is in the quotable vicinity of $25 per ton delivered consuming points, depending on the length of the haul from producing mills. Canadian prime groundwood is $26 to $31 or thereabouts delivered, also according to freight. Scandinavian dry groundwood is $23 to $24 per short ton ex dock American Atlantic seaboard, and moist $22 to $23.

◆ Chemical Pulp

Some domestic pulp producing mills intend to continue delivering bleached sulphite during the third quarter of the year on a price basis of 2.50 cents a pound, ex dock American Atlantic seaboard, notwithstanding that it is commonly agreed the current price level of such pulp—domestic and foreign—is 2.65 cents upwards, according to mill brand and shipment position. Domestic bleached soda pulp holds firmly to a price level of 2.60 cents delivered paper mills. Unbleached sulphite is on a range of about 1.85 to 2 cents Atlantic seaboard basis, with higher asked for some grades and some news grades perhaps available down to about 1.75 cents.

◆ Chemicals

Most papermaking chemicals are moving freely to consuming mills, especially against contracts, and prices rule steady. Bleaching powder is quoted 2 to 2.15 cents per pound, in drums, f.o.b. works. Salt cake is $12 to $13 a ton, and chrome salt cake $11 to $12, at works. Rosin quotations have firmed to $4.25 per 280 pounds, in barrels, for papermaking gum rosin at southern works.

◆ HARRY V. MERCER has been appointed advertising manager of The American Rolling Mill Company, Middletown, Ohio. This is a newly created office in the Armco organization. Mr. Mercer has been associated with the company since May, 1916.

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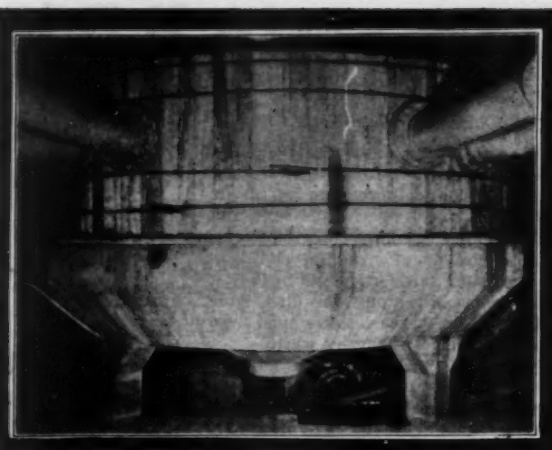

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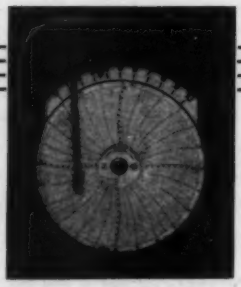

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Import and Export MARKETS

IMPORTS

◆ Wood Pulp

Imports of wood pulp into the United States are on the way to establishing a new high record this year, if the large receipts during the first quarter should be maintained. Thus far this year, or during the first three months, pulp importations have recorded an appreciable increase over a year ago, and more chemical pulp was imported into this country during 1935 than in any previous calendar year. Official statistics issued by the U. S. Department of Commerce show that imports of both mechanical and chemical wood pulp into the United States in the first quarter of 1936 were approximately one-quarter larger than in the corresponding time of 1935.

Chemical pulp imports during the first three months of the current year totaled 462,641 short tons of 2,000 pounds, air dry weight, valued at $17,617,225 a rise in quantity of 98,654 tons, or 27.0 per cent, compared with 363,987 short tons of a declared value of $14,437,407 imported in the similar period of 1935. Groundwood imports in the first quarter of 1936 aggregated 48,790 short tons, valued at $835,371, an increase in tonnage of 9,531 tons, or 24.2 per cent, over 39,259 short tons of a value of $645,972 in the same time of 1935.

March arrivals of pulp into the United States from foreign sources registered a decrease as contrasted with the month preceding but were above the receipts in the corresponding month a year ago. Chemical pulp imports in March amounted to 128,249 short tons of a value of $5,072,658, against 143,454 short tons of a value of $5,602,125 in February this year and 106,919 short tons of a value of $4,372,558 in March last year. Groundwood imports in March were 18,256 short tons of a value of $303,441, compared with 12,318 tons of a value of $212,024 in the month preceding and 12,476 tons of a value of $194,650 in March, 1935.

Steadiness marks imported wood pulp prices. The market has unquestionably quieted, yet members of the trade say this is due in good part to the fact that consuming buyers, having found by experience that it is difficult to secure the pulp desired in the shipment positions wanted, have let down in their effort to buy. In short, it is declared in the trade that considerable additional tonnages of pulp—more particularly bleached sulphite and kraft pulp—could be readily marketed if the necessary pulp was available for shipment from abroad during the balance of this year. A large majority of producing mills in Europe are so well outsold for 1936 they are offering very sparsely, at least some mills being entirely out of the market as sellers at present.

Opinion in the trade is that many, probably a majority, of paper and board mills in the United States have their requirements in pulp covered for the remainder of this year. On the other hand, there are some which are far from supplied, it is asserted, and the belief is that later in the year or along about the middle of the fall it is as likely as not a distinct pinch in supplies may develop when and if these uncovered consumers come into sight to purchase requirements. Consumers apparently sense this probability, too, and are freely absorbing any lots of desirable pulp which are made available at anything smacking of reasonable prices in line with what are regarded as prevailing market levels.

Prime bleached sulphite is 2.65 to 2.75 cents a pound for forward shipment from abroad ex dock American Atlantic seaboard, with spot lots or prompt shipments reported readily fetching the higher edge of this price range. It is not an easy matter to locate procurable supplies of prime bleached, and pulp importers and agents say they are constantly turning down offers of business from consuming customers. Prime strong unbleached sulphite is 1.90 to 2.05 cents a pound Atlantic seaboard, according to mill brand and shipment. Prime Scandinavian kraft is 2 to 2.10 cents for spot or prompt shipments, whenever available, with the probability that buyers are securing some forward supplies a shade under this price basis. Imported groundwood is quoted at $23 to $25 per short ton ex dock American Atlantic ports for dry prime, and $22 to $23 for moist.

◆ Paper Stock

Importers of paper base stocks into the United States to the end of March were running considerably ahead of last year's incoming shipments of these products, reports the U. S. Department of Commerce. Imports of wood pulp, which represent the bulk of these receipts, showed a rise of about 25 per cent in volume compared with the first three months of last year, all classes of pulp sharing in the increase. A proportionately heavier increase took place in imports of papermaking rags and other waste, which more than doubled in quantity. The only exception to this upward trend was offered by pulpwood, imports of which dropped off nearly 10 per cent compared with last year. Aggregate imports of this group during the first quarter of 1936 were valued at $20,760,916, representing 511,346 tons of wood pulp valued at $18,442,596; 151,207 cords of pulpwood valued at $919,712, and 47,395 tons of rags and other waste valued at $1,398,608.

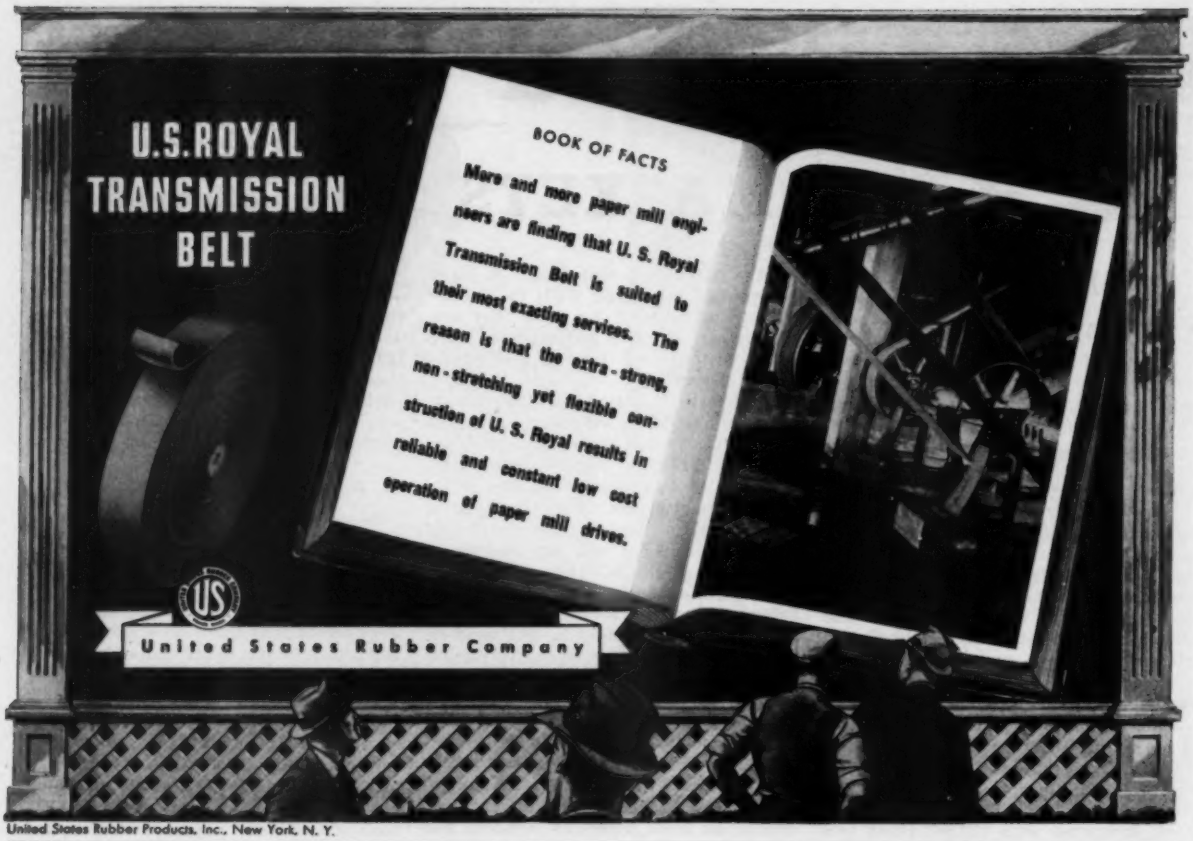
◆ Paper

Imports of newsprint paper, which constitute about 85 per cent of the total imports of paper and paper products into the United States, were 16 per cent higher during the first three months of the current year than in the corresponding period of last year, while March imports showed an increase of 20 per cent over March, 1935. Larger receipts during the present year are also noticeable in a number of other items. Aggregate imports during the first three months of 1936 were valued at $22,315,239, of which amount $19,189,562 represented 558,079 tons of newsprint paper, and contrasted with imports of a value of $19,074,609 in the corresponding quarter of last year.

EXPORTS

U. S. Department of Commerce statistics show that exports of paper and paper products from the United States were nearly 10 per cent higher during the first three months of the current year than the same period of 1935. Shipments of a number of items, notably newsprint, surface-coated, toilet paper, old newspapers, wallboards and paper bags, did not reach the level of last year, but these decreases were more than offset by a rise in shipments of book and writing papers, boards, including sheathing papers and insulating boards, vulcanized fibre and a number of minor items, among others cash register paper. Exports of all classes of paper and paper products in the month of March last reached a valuation of $1,912,203, bringing the total for the first three months of the year up to $5,419,331, compared with $4,973,897 during the corresponding period of 1935.

In addition, the United States exported during the first quarter of 1936 $1,804,789 worth of paper base stocks. These shipments comprised chiefly bleached and unbleached sulphite wood pulp, with rags and waste ranking second in importance. Unlike paper, exports of this group showed a marked decrease compared with the first quarter of 1935, when such shipments were valued at $2,819,678.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